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A TEXT-BOOK OF
GYNECOLOGY

A TEXT-BOOK OF
GYNECOLOGY

Geo. B. Somers

BY

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*ITH ONE HUNDRED AND THIRTY-EIGHT ILLUSTRATIONS
IN TEXT*

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PREFACE

In preparing this volume the limited time of the overcrowded medical student has been taken into consideration. The facts have been stated briefly and an attempt has been made to put them clearly. Many subjects that are given space in text-books on gynecology, but which belong to general surgery, have been omitted. Many rare diseases are treated very briefly. The greater amount of space is given to diseases that are common and with which it is essential that the student should be familiar. It is believed that enough has been given on each subject to constitute a thorough presentation of it.

I am indebted to Mr. Herman Schapiro for the photographs of the gross pathological specimens and for the photomicrographs. These gross specimens, and the slides from which the photomicrographs were made, are a part of the material which I have been using for several years in teaching diagnosis and living gynecological pathology. I am indebted to Mr. W. Starr Gebhart, Jr., and to Dr. J. A. Rippert for the line drawings. Dr. G. Alvin Strauss and Dr. A. Samuels gave material assistance in examining the preliminary copy and noting omissions of fact.

William S. Gardner.

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27242

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A TEXT-BOOK OF GYNECOLOGY

CHAPTER I

EXAMINATION OF THE PATIENT

Clinical Record. — Too much stress cannot be laid upon the necessity of taking a careful clinical record of each patient. The record should include a history of the patient's symptoms as given by her in reply to certain routine inquiries and to additional questions asked to develop fully any particular complaint that may be noted. The patient should then state in her own way any further facts that have a bearing upon her condition. The record must be brief but must cover fully a few essential points. There is rarely any occasion to go into the family history. The more important points to be covered in the record are indicated in the following outline.

Date.   Name.   Age.
Residence.   By whom referred.
Appetite.   Bowels.   Defecation.
Micturition.
Previous illnesses and operations.
Gonorrhea.   Syphilis.
Pregnancies.
Menses.
General complaints.
Physical examination.

The NAME of the patient is wanted as a matter of identification.

The AGE is taken because it has a direct bearing on the sum of probabilities that make up the diagnosis, since some diseases are much more common at certain periods of life than at others.

The record of the RESIDENCE is kept principally as a part of the identification, but it often will help directly by throwing light on the social status of the patient.

Inquiry into the condition of the APPETITE and BOWELS should be made because, no matter what the local condition is, the nutrition of the patient is always a matter of importance and must be looked after.

It should be ascertained whether DEFECATION is painful or not; if it is painful, whether the pain is present only during defecation or continues for some time afterwards and how long the symptom has been present.

In reference to MICTURITION, it is important to know whether it is too frequent or painful, or both, and if so, how long these symptoms have been present.

In recording the PREVIOUS ILLNESSES, it is of no advantage to go into the history of the diseases of childhood, or even those of later life, except those illnesses that had some predominant pelvic or abdominal symptoms. The most important of these are the infections after labors or after miscarriages. Unfortunately the history that most patients give of previous operations is very vague, but in cases where abdominal operations have been performed it is of great assistance to know accurately what has been done.

As a rule no valuable information is obtained by asking directly if the patient has had GONORRHEA OR SYPHILIS. It is much better to make inquiry as to the history of the symptoms that may have been due to these diseases. If the patient has had gonorrhea, there will usually be a history of a profuse vaginal discharge associated with burning micturition, the date of which can usually be fixed. If she has had syphilis, there will usually be a history of a skin eruption, falling hair, or repeated sore throat.

It is hardly necessary to go into the history in detail of each one of the patient's PREGNANCIES. The number of labors at full term and the number of miscarriages should be noted, and what is of great importance is to know whether the last pregnancy ended as a full term labor or as a miscarriage, the date of termination, and whether it was followed by any symptoms of infection.

In noting the MENSTRUAL history the first point is the date of the last period. If there has been anything irregular about this last period, then the dates of two or three previous periods should be noted. Never accept the patient's statement that she is always regular; get the exact dates. Note the frequency, duration, and relative quantity of blood lost. If pain is present during the period, determine what the time relation is between the pain and the flow, what the character of the pain is, and how long the patient has suffered from it.

When these points have been noted, the patient should be asked to state her definite complaints. The location and character of any pain and the length of time she has suffered from it should be recorded in detail.

Abdominal Examination. — In beginning the physical examination, it is best to start with the examination of the abdomen. The bladder and rectum should be emptied and the patient put in the dorsal position with the limbs extended. All coverings between the ensiform appendix and the symphysis should be removed.

Inspection, palpation, percussion, and auscultation are all employed.

INSPECTION. — By inspection the size and general contour of the abdomen is noted. When there is an enlargement, the shape, the point of greatest prominence, and the extent of the movements of the abdominal wall during respiration are noted. Striæ indicating previous distentions, pigmentation, and enlarged veins should be looked for. In pregnancy the fetal movements can often be seen. Cicatrices, the result of previous operations, should be noted.

PALPATION. — By palpation, tumors, displaced organs, points of tenderness, and areas of muscular rigidity are discovered. The hands of the examiner should be warm and he should proceed slowly and gently, beginning by preference over that portion of the abdomen where nothing abnormal is likely to be found. If this is done, by the time the portion of the abdomen is approached which is suspected to be abnormal it will be found that the patient's timidity, and much of the associated muscular rigidity, will have disappeared and the examination can be made much more easily.

After going over the abdomen in a general way special attention should be directed to the regions of the appendix, the gall-bladder, the kidneys, and the ovaries. The most common location of the appendix is just below the middle of a line extending from the umbilicus to the anterior superior spine of the right ilium. The common signs of disease of the appendix are tenderness, elicited by deep pressure and rigidity of the muscles over this area. In exceptional cases a mass can be palpated. Disease of the gall-bladder is indicated by tenderness and muscular rigidity over its region, and particularly by the inability of the patient to take a full breath when the fingers are pressed firmly under the edge of the ribs just to the right of the median line. The thickness and tension of the abdominal walls should be noted.

Palpation is very much facilitated if the patient is instructed to breathe deeply. On expiration the abdominal wall relaxes and the deeper structures in the abdomen can be palpated without making undue pressure. If a tumor is present, some idea of its size, origin, mobility, and density can be made out. Fluctuation can be felt in cystic tumors, but the wave produced by tapping the tumor on one side while one hand is held against the opposite side can be felt clearly only in exceptional cases. The value of this sign has been exaggerated. The beginner frequently confuses the true fluctuation wave with the impulse transmitted by the abdominal wall.

PERCUSSION. — By percussion the tympanitic and dull areas are mapped out and their relation to each other and to any palpable tumor are noted. It is very important to observe whether the relation of these areas to each other change with the change of the position of the patient.

AUSCULTATION. — The most important sign elicited by auscultation is the presence or absence of the fetal heart sounds.

Vaginal Examination. — When the abdominal examination is completed the next step is the examination of the external genitals and the pelvic contents by way of the vagina. This is done by inspection, the simple vaginal touch, and by the bimanual examination. Before attempting a vaginal examination the patient should be put in the dorsal position with the legs flexed and separated, but the thighs must not be pressed upon the abdomen. A simple way to get a good position is to flex and separate the knees but keep the feet on a level with the back. The bladder must be empty.

INSPECTION. — Practically all the ordinary diseases of the vulva can be diagnosed by inspection. By separating the labia any pathological condition of the vestibule and vaginal orifice is exposed and the condition of the perineum and the color and position of the anterior and posterior vaginal walls near the outlet are noted.

SIMPLE VAGINAL TOUCH. — By simple vaginal touch is meant the examination by the introduction of one or two fingers into the vagina and the palpation of the vaginal walls and cervix without any counter pressure. By this method pathological conditions of the vaginal portion of the cervix, of the vaginal walls, or any pelvic growths that displace the vaginal walls, can be detected.

BIMANUAL EXAMINATION. — One or two fingers are introduced into the vagina while counter pressure is made over the lower segment of the abdomen by the other hand. The first thing to ascertain is the position of the uterus. When the uterus is in the normal position, if the fingers in the vagina are placed under the cervix and then elevated the fundus can be felt by the external hand just above the symphysis (Fig. 1). The fingers in the vagina can then be slipped forward and the body of the uterus grasped between the fingers of the internal and external hands. In this way its size, shape, and consistence can be determined. When the body of the uterus is not found in the normal position, it should be sought for first posteriorly and then laterally. The broad ligaments, the tubes, anc the ovaries are then palpated. This can be done ver readily after the uterus has been located by slipping t fingers of both hands, between which the uterus is lyin either to the right or to the left. By this movement t broad ligament and everything attached to it must co between the opposed fingers.

Complete anesthesia facilitates all bimanual exa minations and is absolutely essential in many cases. Anesthesia is called for not to relieve pain produce the examination, but to secure muscular relaxation.

Instruments Used in Examination. — During the exa retractor of Simon. The blades of this speculum are made in different sizes, and the blade can be selected which is best suited to the case.

It is often necessary to draw the uterus down, and when the patient is not under an anesthetic this should be done with a tenaculum. If it is introduced well into the cervical canal a good hold can be taken without giving any pain. A simple rule for the use of the tenaculum without giving the patient discomfort is to avoid mucous membrane that is covered with squamous epithelium.

The dressing forceps are used to wipe away any discharge and clear the field.

To carry the examination beyond this point it is usually necessary to use an anesthetic. The patient should be in the lithotomy position, with the hips drawn well over the end of the table. Bullet forceps or a small volsellum are used to draw the uterus down, because stronger traction can be made with them than with a tenaculum, and it is not necessary to avoid the sensitive areas.

For rapid dilatation of the cervix some pattern of the parallel-bar dilator is preferable. It is not necessary to make a very wide dilatation.

The curette for obtaining material for microscopical examination from the cavity of the uterus or the cervix should be sharp, and so made that the edge will strike at right angles to the surface to be curetted. The material should be removed in as large fragments as possible.

When a piece of the cervix is required, a small triangular section can be removed with scissors and the wound closed with one or two sutures.

The uterine sound is purposely omitted from the list of instruments ordinarily used in making examinations, for the reason that the small amount of information to be obtained from it is more than counterbalanced by the harm resulting from its unskilful use. The man who cannot make a diagnosis of pregnancy at the eighth week by bimanual examination cannot use a sound with reasonable safety. The man who can make a diagnosis of pregnancy at the eighth week very rarely has occasion to resort to the sound.

Before operation the urine should be examined in all cases. It is also well to make a blood examination as a routine measure; but it is especially indicated if the patient has a temperature above normal or is anemic.

Positions. — For examination or for operation the patient may be placed in the following positions:

First Dorsal Position. — In this position the patient lies on a straight table, the limbs and body on the same plane. The patient is placed in this position in making routine abdominal examinations and in doing many abdominal operations.

Second Dorsal Position. — In this position the hips and back of the patient are on a level table. The knees are flexed and separated. The feet are kept on the same level with the hips and back. This position is used for the examinations of the external genitals and in bimanual examinations.

Lithotomy Position. — In this position the patient lies on the back, the legs are flexed on the thighs, and the thighs upon the abdomen. This position is used for all vaginal operations. With the patient in the same position except with the hips very much elevated the cystoscope is used.

Trendelenburg Position. — In this position the patient lies on the back with the limbs extended. The pelvis is elevated while the knees are slightly or not at all flexed. This position is used in nearly all pelvic operations that are done through the abdominal wall. The position assists in keeping the intestines out of the way and in exposing the pelvic contents to the view of the operator.

Sims Position. — In the Sims, or left lateral position the patient lies on the left side with the left arm drawn behind. The knees are flexed and the right knee is drawn a little forward and over the left one. Many of the plastic operations about the vagina and cervix can be done in this position, but the majority of operators have abandoned it for the simpler lithotomy position.

Knee-Chest Position. — In this position the patient rests with the chest on the table. The knees are drawn up under her with the thighs kept at right angles to the surface of the table. This position is used principally for assisting in the readjustment of retrodisplacements of the uterus, to temporarily relieve pelvic congestion, and in exploration of the bladder.

CHAPTER II

MENSTRUATION

Normal Menstruation. — The periodic flow from the mucous membrane of the body of the uterus, called the menses, usually makes its appearance when the girl is from thirteen to fifteen years old. The flow recurs every twenty-eight days, and ordinarily continues from three to five days. When the flow lasts less than three days it is usually scanty in quantity, and when it continues more than five days there is generally some pathological condition to account for it.

The flow commonly begins and ends with a flow of mucus without blood. The larger part of the menstrual discharge, as it escapes from the mucous membrane of the uterus, is a mixture of blood and mucus; but in addition there are some small round cells that have escaped through the surface and glandular epithelium and some epithelial cells. When the blood and mucus are present in the normal proportion, the discharge will not coagulate; but when there is an excessive proportion of blood, coagulation takes place. It is difficult to determine the quantity of blood lost at each period, but it is estimated that the average amount is about four ounces.

As the time of the flow approaches, the breasts become fuller and slightly tender, there is more or less feeling of general malaise, there is a sense of weight and heaviness in the pelvis due to congestion; but under normal conditions there is no pelvic pain of any moment.

During menstruation there is no material loss of any portion of the endometrium. The blood escapes between the epithelial cells, and it is only over small areas that these epithelial cells are carried away.

The exact relation of ovulation to menstruation is not known. The changes in the endometrium during the menstrual cycle are described in the section on the anatomy of the uterus. These changes in the endometrium and the menstrual flow are in all probability due to an ovarian secretion.

Precocious Menstruation. — When regular menstruation begins at an unusually early age, it is known as precocious menstruation. This term does not include occasional bloody discharges that are usually due to some local lesion, nor the slight flow from infants that is sometimes observed soon after birth. In cases of precocious menstruation there is a premature development of the generative organs.

Delayed Menstruation. — When regular menstruation is not established until long after the usual age, it is called delayed menstruation. In these cases there is usually a failure of development of the genital organs or the delay may be due to anemia.

Vicarious Menstruation. — A periodic flow of blood from some other mucous membrane than that of the uterus is known as vicarious menstruation. It is rarely seen, but when it does occur the hemorrhage comes most frequently from the nasal mucous membrane.

MENOPAUSE

The end of the child-bearing period of a woman's life is known as the menopause, climacteric, or change of life. The most important phenomenon of this period is the cessation of ovulation; but the most obvious indication that the individual has reached the menopause is the disappearance of the menses. In exceptional cases ovulation may continue after the menses have failed to appear, but ordinarily both cease at about the same time. The menstrual life of most women covers a period of a little more than thirty years. In a very large per cent of cases the flow ceases to recur about the age of forty-seven, but the age of cessation is subject to wide variations. The menopause may be established at the thirtieth or the flow may continue up to the fifty-seventh year. As the menopause approaches, the flow usually decreases in quantity for a few periods, skips an occasional period and then ceases. During the period of diminution and for a time after the final cessation of the menses, many women have flushes of heat and other nervous phenomena; but the establishment of the menopause is a physiological process, and many grave errors in diagnosis are made by charging up to "change of life" too many symptoms of which women of forty-five complain. It is of especial importance to remember that any excessive flow from the uterus, bloody or otherwise, about the time of the menopause is a danger signal that calls for immediate investigation. Over fifty per cent of women who begin to bleed from the uterus after the establishment of the menopause have some form of carcinoma of the uterus.

With the establishment of the menopause there is an associated atrophic process in the genital organs. The ovaries become small and cirrhotic. The Fallopian tubes decrease in size and the folds in the mucous membrane partially disappear. The uterus decreases in size; the atrophy of the cervix may go so far that only a little dimple is felt in the walls of the vagina. The vagina decreases in calibre, becoming more tubular or even funnel-shaped. The folds in the vaginal mucous membrane disappear. The labia lose their deposits of fat and become little more than folds of skin.

DISORDERS OF MENSTRUATION

The disorders of menstruation are discussed briefly to mpress upon the student that they are only symptoms of underlying pathological conditions, and that before any treatment is instituted the cause of the disorder must be discovered.

Amenorrhea. — Amenorrhea is the absence of the menses during that period of life when a woman should be menstruating regularly. A PRIMARY AMENORRHEA is one in which the menses have never become established. A SECONDARY AMENORRHEA is one in which the menses have ceased after they have become established. Primary amenorrhea is due to a failure of development of some of the reproductive organs. Secondary amenorrhea is frequently due to the anemia of chlorosis, tuberculosis, or some other disease that decreases the quantity of red blood cells. Destruction of the ovaries by disease or their removal by operation causes a cessation of menses. Among the more remote causes are change of climate and mental strain. Some very obese women cease to menstruate at a very early age, but the direct relation between the accumulation of fat and the amenorrhea has not been established. Recent observations indicate that in these cases of obesity there is a deficient secretion of the pituitary gland. There is a considerable number of cases in which the cause of cessation is not obvious. In primary amenorrhea, as a rule, the menses never appear; but in some cases the patient will menstruate for a few times, usually scantily and at irregular periods, and then the menses will cease. In secondary amenorrhea there is usually a progressive decrease in the quantity of flow for several periods before complete cessation. When a woman who is apparently in good health and has been menstruating regularly up to a definite time suddenly ceases to menstruate, there is always a strong presumption of pregnancy. In any case in which there is a congenital atresia of the cervix or vagina or an imperforate hymen, the menstruation may be perfectly regular, but the blood does not escape to the outside. These patients usually come to the physician complaining that they do not menstruate.

The cessation of the menses during pregnancy and lactation should not be classed as amenorrhea.

The administration of so-called emmenagogues and " uterine tonics " is not only unnecessary and useless in amenorrhea, but by centering the attention of the physician and patient upon a symptom instead of the disease is positively harmful.

Uterine Hemorrhage. — Uterine hemorrhage is usually spoken of as menorrhagia or metrorrhagia. MENORRHAGIA is an excessive flow of blood from the uterus at the time of the regular menstrual period. METRORRHAGIA is an excessive flow of blood from the uterus at any other time than the regular menstrual period. It is not possible to draw a hard and fast distinction between the two varieties of hemorrhage, because there are many lesions that cause both menorrhagia and metrorrhagia. Menorrhagia may be caused by endometritis, hypertrophic endometrium, retro-displacement of the uterus, sub-involution, uterine fibroids, salpingitis, varicose veins in the broad ligaments, ovarian tumors, or excessive ovarian secretion. Metrorrhagia may be caused by uterine fibroids, carcinoma of the cervix or body of the uterus, sclerosis of uterine arteries, adenoma of the uterus, endometritis, incomplete miscarriage, extra-uterine pregnancy, uterine moles, chorio-epithelioma, inversion of the uterus, or malignant ovarian tumors.

The uterine hemorrhage due to *endometritis* usually manifests itself after a definite infection and is very commonly associated with salpingitis. In a considerable number of cases during the first menstrual period after the tubes have become infected there is not only an excessive flow of blood but large clots are passed associated with pain. The symptoms resemble fairly closely the symptoms ordinarily observed during a miscarriage. At the succeeding menstrual periods the amount of blood lost usually decreases.

A *hypertrophic endometrium* may cause menorrhagia or metrorrhagia at any age, but most frequently about the time of the menopause. It is one of three most common causes of excessive uterine bleeding at the climacteric.

Menorrhagia is more frequently associated with acquired *retrodisplacements* than with the congenital form. The history shows that the increased flow has begun relatively soon after the last labor, that the daily amount of blood lost during the menstrual period may be only slightly increased but the period is usually prolonged.

The hemorrhage due to *uterine fibroids* usually begins as a gradually increasing menorrhagia. Later the flow of blood may become almost continuous. *Carcinoma* of the body of the uterus may cause in the beginning a menorrhagia, but in most instances the hemorrhage due to carcinoma has little or no relation to the menstrual period. Every patient who bleeds after the establishment of the menopause should be suspected of having uterine carcinoma.

The hemorrhage due to *incomplete miscarriage* is due to a partial detachment of the placenta. Not infrequently it is very profuse. In *extrauterine pregnancy* there is a history that the menstrual period has been delayed a few days and that the period has come on with more pain than usual. Following this there is a continuous dribble of blood from the uterus that may go on for days or weeks. The hemorrhage due to *chorio-epithelioma* comes on after a labor, a miscarriage, or the expulsion of a hydatiform mole. It is a continuous, fairly profuse flow and recurs promptly after curettage.

Dysmenorrhea. — Dysmenorrhea is painful menstruation. It may be caused by endometritis, retrodisplacement of the uterus, salpingitis, anteflexion of the uterus, cervical stenosis, uterine fibroids, and diseased and prolapsed ovaries. In three hundred cases of dysmenorrhea examined the frequency of these lesions was in the order in which they are mentioned. There is an occasional patient who has pain at the menstrual period in whom no gross lesion can be found.

One of the most characteristic dysmenorrheas, although by no means the most frequent, is the one in which the pain is due to *anteflexion* of the uterus or *congenital stenosis* of the cervix. These patients as a rule give a history of having had pain with each period from the time they first began to menstruate. The pain begins just before the flow makes its appearance. It is paroxysmal and very severe. After the first twenty-four hours the pain is very much diminished and gradually passes off. In the intermenstrual period these patients suffer from no discomfort whatever.

There is nothing characteristic about the dysmenorrhea associated with *retrodisplacements.* It is only an exaggeration of the more or less constant discomfort from which the patient suffers.

The dysmenorrhea due to *salpingitis* is usually worse just before the flow begins. It not infrequently disappears entirely during the middle period of the flow and returns for a day or more at the cessation of the flow.

The pain during the menstrual cycle associated with *diseased* or *prolapsed ovaries* frequently comes on a week before the flow and continues during the whole period and for a few days after the cessation of the flow. The pelvic discomfort in these cases is very commonly accompanied by a severe occipital headache.

In MEMBRANOUS DYSMENORRHEA a thickened endometrium is cast off in parts or as a whole at each menstrual period. This thickening of the endometrium is due to an infection. The pain produced by the efforts of the uterus to expel the endometrium are labor-like, very severe, and cease suddenly when the membrane escapes. Membranous dysmenorrhea is sometimes confused with early miscarriage. Each can be distinguished by a microscopical examination of the material expelled. The thickened endometrium expelled in membranous dysmenorrhea shows the cell changes due to infection, while the material expelled after a miscarriage will show either chorionic villi or decidual cells, or both.

CHAPTER III

DISEASES OF THE VULVA

ANATOMY

The vulva includes the labia majora, the labia minora, the clitoris, the vestibule, and the vulvo-vaginal glands.

Labia Majora. — The labia majora are two folds of skin on either side of the vulvar cleft. The outer surface of each labium is pigmented and covered with hairs. The inner surface which lies in contact with the opposite labium is smooth, has rudimentary hairs, and many large sebaceous follicles. The labia are continuous above with the mons veneris, and meet below to form the fourchette. The structures forming the labia majora resemble those of the scrotum. Each labium contains a well-defined encapsulated subcutaneous mass of fat.

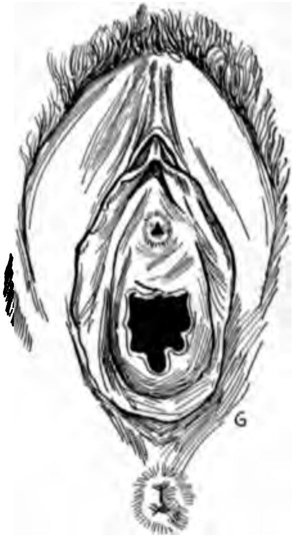

FIG. 2. — EXTERNAL GENITALS.

Labia Minora. — The labia minora, or nymphæ, are smaller than the labia majora and have neither hairs nor fat. Above, each labium divides into two small folds, one of which unites with the corresponding fold of the opposite labium above and the other below the clitoris. Below they gradually diminish in size and terminate opposite the middle of the vaginal orifice.

Both surfaces are smooth, hairless, and studded with large sebaceous glands.

Vestibule. — The vestibule is a triangular space bounded on either side by the labia minora and below by the orifice of the vagina. The meatus urinarius is near its middle. On either side are the bulbs of the vestibule.

Clitoris. — The clitoris is a rudimentary penile appendage. It is erectile and highly sensitive.

Bartholin's Glands. — The vulvo-vaginal, or Bartholin's glands, are two small racemose glands situated one on either side at the level of the middle of the orifice of the vagina. The ducts are about three-quarters of an inch in length and open opposite to each other just in front of the vaginal orifice.

ADHESIONS OF THE LABIA MAJORA

Adhesions of the labia majora may occur as a congenital condition or as the result of an inflammatory process which produces erosion of the epithelium. Subsequently the denuded surfaces on the borders of the labia adhere. The condition is easily recognized by inspection. The adherent borders can usually be separated either by light traction, made by pressure on the labia on either side, or by inserting a probe between the labia near the meatus where they are never adherent and breaking the adhesions from above downward. In exceptional cases it is necessary to use a knife to separate the labia. After the adhesions have been broken up it is necessary to keep the raw surfaces separated from each other by a light gauze pack until they are healed over.

SKIN INFECTIONS

Herpes, eczema, erysipelas, thrush, furuncles, and other skin affections are found on the labia majora; but the symptoms, diagnosis, and treatment are exactly the same as when these diseases occur on other parts of the body.

VULVITIS

All of the ordinary forms of vulvitis or inflammation of the vulva may be grouped under five heads: gonorrheal, follicular, phlegmonous, diphtheritic, and catarrhal.

GONORRHEAL VULVITIS

Gonorrheal vulvitis is an inflammation of the vulva due to a gonococcus infection. It is usually associated with a gonorrheal urethritis and vaginitis.

Symptoms. — The disease develops rapidly. There is much burning and pain about the vulva. The associated urethritis causes painful urination.

Diagnosis. — By inspection it is noted that the labia are red, swollen, and covered with a purulent discharge. In the acute stage abundance of gonococci are found in the discharge.

Treatment. — If the labia are much swollen the patient should be put to bed. Saline cathartics should be administered and acetate of potassium should be given in twenty-grain doses every four hours to alkalinize the urine. Hot moist applications should be made to the swollen parts. When the most acute stage is passed the whole of the infected area should be painted over with a solution of nitrate of silver thirty grains to the ounce. This should be followed up by vaginal douches and washes of any of the milder astringents, such as sulphate of zinc one grain to the ounce, or a weak solution of tannic acid or alum. It is usually not necessary to make more than one or two applications of the nitrate of silver, because the infection on the surface as a rule clears up promptly.

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PRURITUS

Etiology. — Intense itching of the vulva, or pruritus vulvæ, is a symptom that may be due to a lesion of the vulva, to a lesion at some distance from the vulva, or it may be impossible to assign any local cause for it. The vulvar lesions include follicular vulvitis, eczema, herpes, urticaria, trichiasis, and parasites. The extravulvar lesions include diabetes, endometritis, cancer of the uterus, pregnancy, seat-worms, and hemorrhoids. There are a considerable number of cases due to a neurosis. Of all these causes the irritating vaginal discharge, the diabetic urine, and the neurosis are the most important.

The *acrid vaginal discharge* frequently comes from a chronic gonorrheal endometritis. The quantity of the discharge may be so small as to attract little attention, but it is the quality rather than the quantity of the discharge that gives the trouble.

The urine of all patients with pruritus should be examined. A very large portion of stout, elderly women who have pruritus are *diabetics*.

The *neurotic* cases can usually be recognized by the absence of all local assignable causes of the itching, by the extension of the affected area up over the abdomen and down the thighs, and by other indications of an existing neurosis.

In all cases the itching is worse at night and is increased by heat and exercise. The discomfort at times becomes so intolerable that the patient, in attempting to get relief, [illegible] [illegible] the finger nails into the tissues producing abrasions that become infected. The region of the vestibule and the labia minora are the parts usually affected the most severely. The constant irritation and loss of sleep has a very depressing effect, and if long continued the patient may become a mental and physical wreck.

Treatment. — When the pruritus is due to an assignable local lesion the treatment should be directed to its removal, but in the meantime something must be done for temporary relief. A two and a half per cent carbolic acid solution, applied by saturating a cloth with it and applying it to the vulva, is one of the most efficient means of reducing the discomfort temporarily. Dusting the parts with calomel or bismuth subnitrate, and the local application of weak solutions of acetate of lead, alum, zinc sulphate, corrosive sublimate, an infusion of tobacco, or ointments that are purely protective, that carry a parasitacide, or that are a vehicle for a local anesthetic such as carbolic acid or cocaine, are all useful for securing temporary relief.

When the pruritus is due to a vaginal discharge the source of the discharge must be treated. To relieve the vulva temporarily glycerin tampons that change the character of the discharge, or dry tampons that protect the vulva from the discharge are both useful. Mild alkaline vaginal douches and the internal administration of potassium acetate give relief.

When sugar is found in the urine, the patient should be treated as any other diabetic.

The treatment of the neurotic form is very unsatisfactory. Some relief is had from the administration of bromids and the use of the local remedies already mentioned.

HYPERESTHESIA OF THE VULVA

Hyperesthesia of the vulva is an extreme sensitiveness of the vulva to touch. It is sometimes due to local infections, to the irritation from vaginal discharges, fissures, or to urethral caruncle. In most cases of the severe forms the patient is suffering from a neurosis and there is no distinguishable local lesion.

Treatment. — Any local source of irritation should be removed. The treatment of the neurosis is tonics, change of scene, and outdoor life.

CHANCRE

A chancre is an initial lesion of syphilis. It is due to an infection by the Spirochete pallida. The chancre makes its appearance in from fourteen to twenty-one days after infection. In the majority of instances it presents the appearance of a small parchment-like patch on the vulva. It gives rise to no discomfort. If the lesion is on the mucous membrane, there is a small ulcerating area and the tissues beneath are deeply indurated. The small parchment-like chancres that are seen on the skin about the vulva are apparently so insignificant that they are frequently overlooked. The discharge from the chancre is very scanty and of a serous character. The chancre is usually a single sore and not autoinoculable. The inguinal glands enlarge but rarely suppurate. Local treatment has little or no influence upon the chancre. The patient must be given treatment for syphilis.

CHANCROID

A chancroid is an excavating ulcer due to an infection by the strepto-bacillus described by Ducrey. It makes its appearance from forty-eight to seventy-two hours after infection. It usually begins as a small ulcer on the mucous surface of the vulva and enlarges rapidly. It is usually multiple. It destroys very rapidly the tissues of the vulva; but the vagina resists the infection. The connective tissue beneath the vagina is often destroyed without affecting the mucous membrane. Its borders are sharply defined and not indurated. It gives rise to a profuse purulent discharge. It is a local infection and is autoinoculable. The inguinal glands enlarge and have a tendency to suppurate.

Treatment. — The surface of the ulcer should be cleansed and painted over with pure carbolic acid. This acts as a local anesthetic. The same area is then painted immediately with pure nitric acid. One treatment of this sort usually destroys the micro-organisms and converts the chancroid into an ordinary ulcer. It may need to be touched up with a solution of nitrate of silver, but will ordinarily heal promptly if kept clean.

KRAUROSIS

Kraurosis is a process of sclerosis involving the structures of the vulva. The labia minora disappear. The orifice of the vagina becomes greatly contracted. The tissues lose their elasticity and tear readily, especially during labor. The course of the disease is slow, the prognosis is unfavorable, and the results of treatment have been unsatisfactory.

VARICOCELE

Varicocele of the vulva is an enlargement of the veins of the vulva due to pressure within the pelvis. It is most commonly seen in association with pregnancy. It may be due to any intrapelvic growth which exerts pressure upon the veins. There is some tumefaction of the vulva, and the veins can usually be seen through the thin epidermis. Evenly distributed, constant pressure for a short time empties the veins and causes a disappearance of the tumefaction. Hemorrhage may occur from a rupture of one of the veins. This hemorrhage can be controlled by direct pressure or by ligation.

Treatment. — Ordinarily no treatment is necessary, because the condition disappears when the cause of it is removed.

HEMATOMA

A hematoma of the vulva is a collection of blood in the loose connective tissue.

Etiology. — The rupture of the vessels from which the blood escapes is due in most instances to an injury received during labor, but may result from falls or blows.

Pathology. — When the blood is first poured out it dissects the tissues in the direction of least resistance. The blood remains fluid for some time, forming a rounded, fluctuating mass. If not relieved, the blood clots and forms a semi-solid mass. If not disturbed, many of the smaller collections will be completely absorbed. But the process of absorption is slow, and before it is completed many of the larger collections become infected and abscesses are formed.

Symptoms and Diagnosis. — A tumor makes its appearance a few hours after the time the injury has been received. The tumor is of a dark purple color. It is at first soft and fluctuating; but after the blood clots it becomes somewhat firmer. It usually causes very little pain. There is no local rise of temperature unless infection occurs.

Treatment. — When a hematoma is small, it may be let alone and will, as a rule, disappear by absorption. When it is large, a small incision should be made into it, the blood clot pressed out, and a compress put on in such a position as to collapse the cavity. If it becomes infected, it should be opened freely and drained.

EPITHELIOMA

Epithelioma of the vulva, like all cancerous growths, is a disease most frequently met with in individuals past middle life.

Pathology. — The growth begins at the junction of the skin and mucous membrane. It makes its appearance as a small nodule. As the growth extends it obstructs the blood-vessels and cuts off the blood supply to its central portion. The latter breaks down, leaving a crater-like ulcer, with everted indurated edges from which comes an ichorous discharge. It spreads by direct continuity of tissue and through the lymphatics. The inguinal glands become involved comparatively early. A microscopical examination shows columns of epithelial cells growing downward and displacing the other tissues of the vulva (Fig. 5).

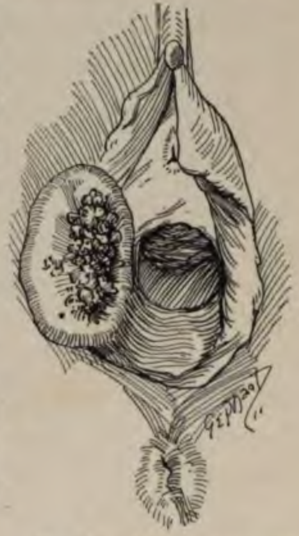

FIG. 4.—EPITHELIOMA OF THE VULVA.

Diagnosis. — The age of the patient, the duration of the process, and the elevated indurated edges are usually sufficient for a diagnosis. To confirm this diagnosis a small section may be taken out for microscopical examination.

Treatment. — The treatment consists in the excision of the growth. This is usually best done by beginning below and dissecting upwards. To prevent excessive hemorrhage, as soon as the lower part of the tumor is freed, the wound should be closed from below upward by deep sutures that go entirely beneath the dissected surface. This alternate dissection and suturing is carried upward until the whole growth is removed. It may be necessary to remove nearly the whole of the vulva; but the normal tissues of this part of the body are so elastic that there is no difficulty in closing very extensive wounds.

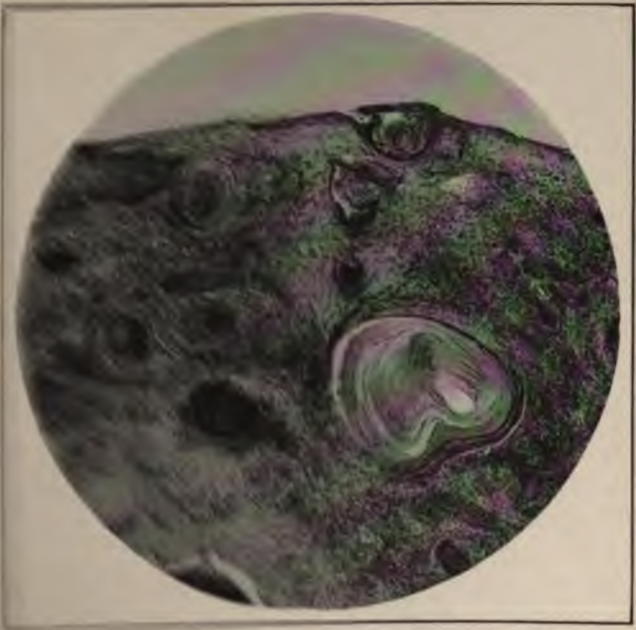

Fig. 3. — Epithelioma of the Vulva. (Photomicrograph.) The epithelial cells are seen growing downward and displacing the connective tissue. Several epithelial pearls are in the field.

ELEPHANTIASIS

In elephantiasis the labia are enormously enlarged, but at the same time they preserve, to a certain extent, their original outlines. The mass is made up of an overgrowth of connective tissue. The growth is a very slow one. Sometimes the more dependent portions become gangrenous. The majority of the cases that are seen here are thought to be of syphilitic origin. In hot climates elephantiasis is rounded tumor in the upper part of the labium major, and is usually so tense that very little fluctuation can be detected. It does not disappear either on pressure or change of position. It is translucent, and all indications of an inflammatory process are absent. It is dull on percussion, and a thin watery fluid can be drawn off with a hypodermic syringe. It increases in size very slowly.

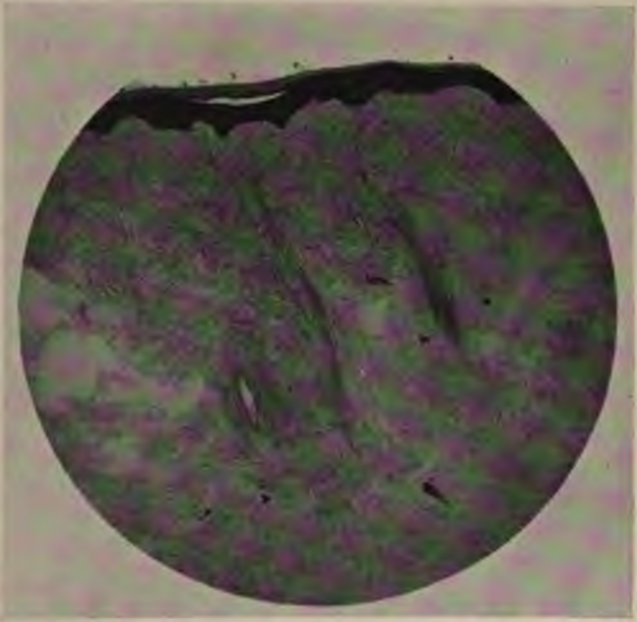

FIG. 7. — ELEPHANTIASIS. (Photomicrograph.) On the surface is seen a thin layer of squamous epithelium. Beneath this the whole tumor is made up of loose connective tissue.

Treatment. — The sac should be dissected out and the wound closed by sutures.

FIBROIDS

Fibroids occur rarely in any part of the vulva. They are round, hard tumors. They increase in size very slowly.

They are not painful, and give trouble only on account of their size and position. They have a tendency to become pedunculated.

Treatment. — When the fibroid is pedunculated the pedicle may be cut through and ligated. When they are sessile they can be cut down upon and hulled out. The cavity is closed by catgut sutures.

VENEREAL WARTS

Venereal warts are of two varieties, — the pedunculated venereal warts which are due to gonorrheal or other irritating vaginal discharges, and the flat chondylomata which are of syphilitic origin. The gonorrheal warts may be few and small, or they may spread over the entire vulva and perineum. On microscopical examination they are shown to have a connective tissue stem covered thickly with many layers of heavy squamous epithelium (Fig. 9). They do not penetrate into the tissues of the vulva beneath the point of origin. The growth is always above the original level from which it started. The warts are soft and spring up rapidly. They give off an acrid serous discharge and bleed readily. The syphilitic chondylomata are flat or have their borders slightly elevated. They are of a grayish white color.

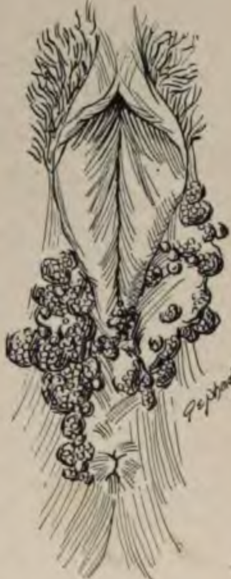

Fig. 8. — Venereal Warts.

Treatment. — In the treatment of the pedunculated warts the point of first consideration is to treat the source of the irritating discharge causing them. In many cases it is necessary to remove the warts either with a knife or cautery. When the warts are removed with a knife, the incisions are very superficial and can be closed entirely by sutures. If the cautery is used, it is best to dust the parts afterward thoroughly with a powder of equal parts of bismuth and calomel. The syphilitic chondylomata, beyond keeping them cleansed, require no local treatment. They usually heal rapidly under constitutional treatment for syphilis.

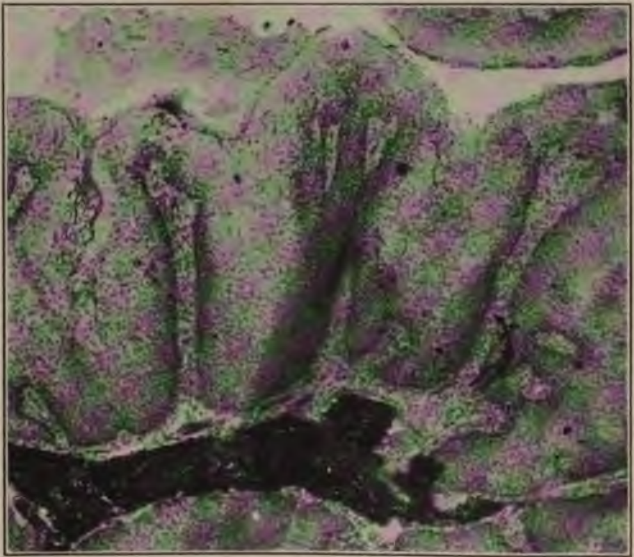

FIG. 9. — VENEREAL WARTS. (Photomicrograph.) The warts are shown to be made up of connective tissue stems covered with many layers of stratified squamous epithelium.

INJURIES TO THE VULVA

Besides the injuries received during labor, wounds of the vulva may occur from blows or more frequently from falls. Any cuts that are received, especially about the bulbs of the vestibule, bleed very profusely. The hemorrhage can be controlled temporarily by direct pressure and permanently by sutures that go entirely under the injured part. It is not practical to attempt to tie the bleeding vessels separately.

INFECTION OF BARTHOLIN'S GLANDS

The vulvo-vaginal, or Bartholin's, glands frequently become infected, and as a result of infection we have three conditions to be considered, — an infection of the gland with a patulous duct, abscess of the gland, and retention cyst.

Infection of the Vulvo-Vaginal Glands with Patulous Duct

The glands are frequently infected by gonococci, and the infection lingers in them long after the mucous membranes of the vulva and the vagina recover. When infected, the gland is slightly enlarged and tender and the orifice of the duct is red. By pressure between the thumb and fingers a small amount of pus can be expressed.

Treatment. — Gentle massage of the gland to express the purulent contents and frequent antiseptic douches usually lead to recovery.

Abscess of the Vulvo-Vaginal Gland

An abscess of the vulvo-vaginal gland produces an ovoid tumor just opposite the orifice of the vagina on one side, at about the junction of the middle and lower third of the vulva. There is a history of previous infection. The tumor forms rapidly. The duct of the gland is usually, though not always, closed. There is pain, redness, and a local rise of temperature that indicates an inflammatory process.

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[illegible] acute cases, when the abscess is [illegible] through the side covered with [illegible] In chronic cases the entire [illegible] dissected out.

RETENTION CYST OF THE VULVO-VAGINAL GLAND

A retention cyst is an accumulation within the gland of the normal secretion of the gland after the duct has become occluded as the result of a mild infection. It is a small round tumor that increases in size very slowly and has none of the symptoms of an inflammatory pro- [illegible] determine its character. [illegible] the entire gland. If any por- [illegible] remain the cyst will refill. [illegible] operation, but it should [illegible]sthetic, because it requires a [illegible]nces would indicate.

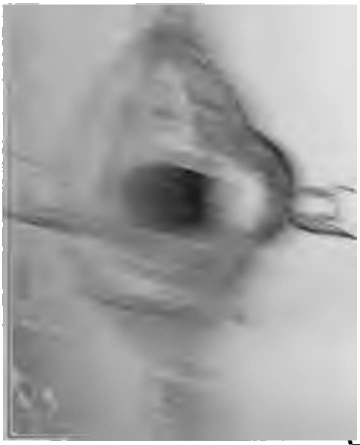


FIG. 9.—[illegible]'s [illegible] to be made up of squamous epithel[illegible]

keeping them [illegible] usually heal [illegible] syphilis.

IN[illegible]

Besides the inj[illegible] the vulva may occ[illegible] falls. Any cuts th[illegible] bulbs of the vestib[illegible]

[illegible] HYMEN

[illegible]tely closes the orifice of the [illegible]ondition and is usually not

CHAPTER IV

DISEASES OF THE VAGINA

ANATOMY

The vagina is that part of the genital tract extending from the vulva to the cervix. The walls of the vagina are made up of mucous membrane, connective tissue, and muscular tissue. The mucous membrane is thrown into folds that are much more prominent in the nullipara than they are in women who have borne children. The surface of the mucous membrane is covered with stratified squamous epithelium (Fig. 11). There are no glands in the mucous membrane. Immediately beneath the epithelial layer is a thin layer of firm connective tissue, and beneath this is a layer of loose connective tissue. The main thickness of the wall of the vagina is made up of muscular fibers which are directly continuous with those of the uterus. These muscular fibers are arranged more or less circularly and longitudinally. There is no vaginal sphincter. The levator ani is the muscle that serves to close the orifice of the vagina. The peritoneum covers a portion of the upper part of the posterior wall. The vagina is not a tubular canal but, when distended, is distinctly balloon-shaped. The cervix is inserted into the anterior vaginal wall where the diameter of the vagina is greatest. This makes the posterior wall apparently very much longer than the anterior wall. When at rest the anterior and posterior walls are in contact with each other. The surfaces are kept moist by the secretion of the epithelium covering them. In this normal secretion is found a large number of non-pathogenic micro-organisms. The most important of these is the acid secreting germ of Doederlein.

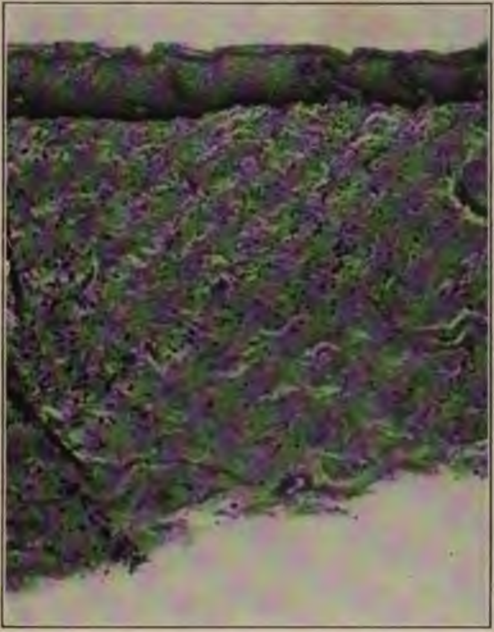


FIG. 11. — NORMAL VAGINAL EPITHELIUM. (Photomicrograph.)

VAGINITIS

Vaginitis is an inflammation of the vagina due to some infecting micro-organism. All forms of vaginitis are relatively rare. This is due in part to the heavy squamous epithelial lining of the vagina, which is a very great protection against infection, and in part to the protection afforded by the presence of the numerous non-pathogenic micro-organisms which exert a deleterious influence upon pathogenic bacteria.

GONORRHEAL VAGINITIS

Gonorrheal vaginitis is seen in association with gonorrheal infection of other parts of the genital tract. It is usually associated with vulvitis, urethritis, and infection of the cervical canal. The mucous membrane is swollen, red, and tender, and gives off a profuse purulent discharge. In the earlier stages of infection gonococci can be readily demonstrated in the discharge. In the later stages of infection the gonococci are very difficult to find.

Treatment. — In the acute stages the patient should be kept in bed and the vagina douched with hot normal salt solution or mild antiseptic solutions. As soon as the first very acute stage is over, the vagina should be distended by a speculum and the entire vaginal wall painted with a solution of nitrate of silver, twenty or thirty grains to the ounce. If necessary the application of nitrate of silver can be repeated every forty-eight hours. After the first application of nitrate of silver the vagina should be douched three times a day alternately, with one to five thousand bichloride of mercury solution, and a weak solution of one of the astringents, such as sulphate of zinc, alum, or tannic acid.

FOLLICULAR VAGINITIS

Follicular vaginitis is found most frequently during pregnancy, or just after the menstrual period. Some patients have a tendency to have recurring attacks with each menstrual period. The part of the vaginal wall affected is that just surrounding the cervix. It presents the appearance of numerous small red areas with white centers. It produces a profuse whitish vaginal discharge. The discharge with the burning and the irritation due to it are the only symptoms.

TUBERCULOSIS OF THE VAGINA

Tuberculosis of the vagina is almost invariably associated with tuberculosis in other parts of the body. The sources of the local infection are discharges from the uterus or from recto-vaginal or vesico-vaginal fistulæ, or the infection may be introduced directly from without. It produces an ulcer of grayish color, with sharply defined borders of reddened, thickened mucous membrane. It can be distinguished from other ulcers of the vaginal wall by the finding of the tubercle bacillus.

Treatment. — As the lesion in the vagina is practically always secondary, the treatment is palliative.

PARAVAGINITIS

Paravaginitis is a streptococcus infection of the loose connective tissue of the vagina. There is much swelling of the vaginal wall, and there is a general rise of bodily temperature with local pain and tenderness. The process tends to suppuration and sloughing.

Treatment. — An incision should be made early into the infected area and drainage promoted by packing the incision lightly with gauze.

ADHESIVE VAGINITIS

(*Senile Vaginitis*)

Adhesive or senile vaginitis in many instances is not a true inflammatory process, but is a result of malnutrition. The epithelium desquamates and the exposed surfaces of the opposing vaginal walls adhere. When an infection is added to this condition, the vaginal walls are reddened and there is an irritating muco-purulent discharge. The discharge causes a burning sensation about the vulva and an obstinate pruritus.

Treatment. — The disease being a local manifestation of the general debility of the patient, it is obvious that local treatment is of little value. Vaginal douches of normal salt solution or of solutions of the milder astringents relieve to some extent the symptoms.

Vaginitis in Children

Vaginitis in children is nearly always due to a gonorrheal infection. The infection is usually an indirect one, and is acquired from infected sheets, towels, or bath-tubs. In exceptional cases it is a direct infection. The vagina and the vulva are red and somewhat swollen. There is a profuse purulent discharge in which the gonococci are readily found. The urethra is sometimes involved, but there is much less tendency for the infection to extend to the uterus and tubes than there is in the adult.

Treatment. — With a soft rubber ear-syringe irrigate the vagina with normal salt solution. Immediately afterwards irrigate with a solution of two grains of nitrate of silver to the ounce. Irrigation with the nitrate of silver solution should be repeated every second day. On the alternate days the vagina should be douched with a bichloride solution, one to four thousand, or a solution of sulphate of zinc, one grain to the ounce. The disease is very persistent, and the treatment should be kept up until the discharge has entirely ceased.

STENOSIS OF THE VAGINA

Stenosis of the vagina is a narrowing of the vaginal calibre due to a failure of development or to cicatricial contractions following injuries to the vagina. These injuries to the vagina may be received during labor, or they may result from ulcerations due to foreign bodies in the vagina, such as pessaries, or from sloughing of the vaginal wall after a streptococcus infection of the cellular tissues of the vagina. The condition is usually discovered when making a vaginal examination for pelvic pain. There are no characteristic symptoms.

Treatment. — The cicatricial bands may be divided and the vagina packed with a glass or hard-rubber plug made for the purpose, but it is manifestly impossible to remove the cicatricial tissue in acquired stenosis. While the calibre of the vagina may be increased by this treatment, its elasticity cannot be restored.

ATRESIA OF THE VAGINA

Atresia of the vagina is a complete closure of the vaginal canal. It may be either congenital or acquired. An acquired atresia may be due to an inflammatory process which destroys the epithelium allowing the two vaginal walls to become adherent, or it may result from a severe injury to the vagina. The symptoms and pathological conditions produced by the accumulation of menstrual blood above the point of obstruction are the same as those given for imperforate hymen. The extent of the atresia can be discovered by digital examination through the rectum.

Treatment. — With a sound in the bladder for a guide anteriorly and one finger in the rectum as a guide posteriorly, a transverse incision is made in the presenting vaginal wall and the opening is carried upward by blunt dissection. Great care should be taken not to injure either the bladder or the rectum. After the accumulated blood is drained out the entire cavity is loosely packed with gauze.

It will be necessary to use either a gauze pack or a glass or hard-rubber vaginal plug for a considerable length of time to prevent the vaginal walls from again adhering.

VAGINAL CYSTS

Vaginal cysts are of two varieties, occlusion cysts and cysts developing in a patulous portion of Gartner's duct. *Occlusion cysts* are usually found in the posterior vaginal wall and are secondary to injuries to the vaginal wall received during labor. In the process of healing of a vaginal tear, if a small fragment of epithelium be overgrown, it continues to develop and eventually lines a small cavity. The secretion from this epithelium gradually distends the cavity and forms a cyst. The cysts are usually small in size and give rise to very little disturbance. The *cysts* developing in *Gartner's duct* are found just a little to one

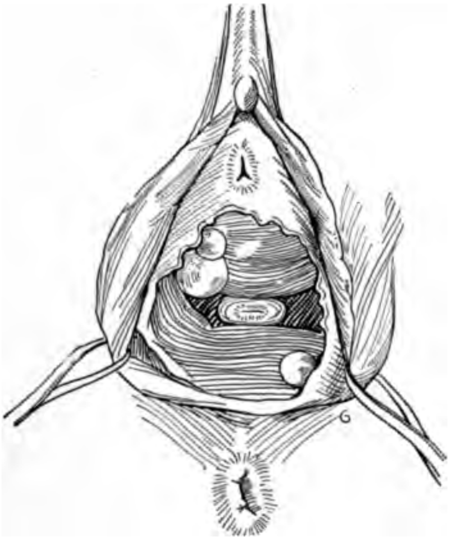


Fig. 12. — Vaginal Cysts.

side or other of the median line in the anterior vaginal wall. They may be single or there may be a series of them corresponding to several dilatations in the duct. They are thin-walled cysts filled with an almost clear fluid. In exceptional instances they communicate with a broad-ligament cyst. They develop slowly but may become sufficiently large to fill up the entire calibre of the vagina. They fluctuate, and are smooth, round, and translucent.

Treatment. — Make an incision through the mucous membrane over the cyst. Dissect out the entire cyst. If it is in the anterior vaginal wall care should be taken not to injure the urethra. Close up the cavity with fine catgut sutures.

SOLID TUMORS OF THE VAGINA

Fibroids, primary carcinoma, sarcoma, and chorio-epithelioma of the vagina are occasionally met with.

Fibroids may occur as sessile or pedunculated tumors. They are easily recognized by being round and hard. Sessile fibroids may be removed by making an incision through the mucous membrane over the tumor and enucleating it. The pedunculated tumor may be removed by tying off the pedicle and cutting through it.

Primary carcinoma of the vagina usually occurs in a prolapsed anterior wall. In the earlier stages the vaginal wall is thickened, but it is usually necessary to examine a section of it with the microscope to be sure of the diagnosis.

Sarcoma usually forms a round soft mass. It may start from any portion of the vaginal wall.

Chorio-epithelioma may occur in the vagina either with or independent of a similar growth in the uterus. It forms a round dark red, soft mass. Microscopical examination shows that it is made up of large unlined blood spaces, large decidua-like cells, and a few syncytial cells.

VAGINISMUS

Vaginismus is a painful spasmodic contraction of the vagina set up by attempts at coition. It is usually a neurotic condition, but may be due to urethral caruncle, irritable hymen, inflamed carunculæ myrtiformes, or fissure of the vulva. The spasm is usually produced when an attempt is made to introduce anything into the vagina, but cases are seen where the contractions are very severe on attempts at coition and entirely absent on digital examination or when a speculum is introduced.

Treatment. — When a local cause can be discovered it should be removed. In some of the milder cases an application to the vulva of an ointment containing cocaine just before retiring is all that is necessary. Gradual dilatation of the orifice of the vagina with bougies under cocaine, forcible dilatation under general anesthesia, and incision into the vaginal sulci have all been used successfully.

DYSPARUNIA

Dysparunia or painful coition is frequently confused with vaginismus. Vaginismus prevents coition; dysparunia is pain during the act and may be due to a large number of pathological conditions. Some of the more common causes are intact hymen, vulvitis, urethral caruncle, irritable carunculæ myrtiformes, vaginitis, cervicitis, prolapsed ovaries, salpingitis, etc.

CHAPTER V

INJURIES TO THE PELVIC FLOOR

ANATOMY

The pelvic floor or diaphragm is made up of the levator ani muscle and the fascia which encloses it. The *levator ani* arises on either side anteriorly from the pubis, posteriorly from the inner side of the ischial spine. Between these two points it is attached to the whole length of the arcus tendineus. In the median line posterior to the rectum is a tendinous raphe into which the muscle from both sides is inserted and which is attached to the tip of the coccyx. A part of the muscle fibers from both sides interlace with the longitudinal layer of the muscular fibers of the rectal wall, and a part with the longitudinal fibers of the muscular wall of the vagina.

The *fascia* of the levator ani muscle is a subdivision of the obturator fascia. From the arcus tendineus, or white line, two laminæ are given off, — one, the recto-vesical to the visceral surface of the muscle, the other, the ischio-rectal to the parietal aspect.

These two laminæ of fascia support the greater part of the dead weight that bears upon the pelvic floor, and it is only following severe defects in the fascia that descent of the pelvic viscera occurs. The injuries to the birth canal, which occur during labor and which are ordinarily spoken of as lacerations of the perineum, have little influence upon the pelvic viscera unless the fascia of the levator ani is damaged.

mucous tears when the deeper structures are injured without a tear of the mucous membrane. Tears of the perineum are sometimes classified in four degrees. The first degree includes the tears of the mucous membrane only. The second degree includes the tears down to the sphincter of the anus. In the third degree the sphincter is torn, and in the fourth degree all structures including the rectum are torn.

The majority of lacerations of the perineum are to one side or the other of the median line, and frequently the laceration is on both sides. The deeper lacerations occur on the side corresponding to the position of the occiput of the child's head during delivery, and this being more frequently on the left side, the tears of the left vaginal sulcus are more frequent and deeper than those of the right sulcus. The tear will sometimes extend down to and around one side of the sphincter without going through it. The lateral tears of the perineum are the ones which most seriously injure the levator ani muscle and its fascia. The tears in the median line are less frequent than the lateral tears, and while their appearance is that of grave injury, as a rule, unless very deep, the levator ani muscle and its fascia are not materially injured.

Prolapse of the pelvic organs more frequently follows the lateral tears than the tears in the median line.

Associated Lesions. — As associated pathological lesions and results of injuries to the perineum we have subinvolution, retrodisplacement, and prolapse of the uterus; relaxation of the broad and round ligaments; cystocele and rectocele.

Symptoms. — The symptoms are very largely due to the associated lesions. There is pain in the back, a sense of loss of support and pressure in the pelvis. When a cystocele is present, the bladder very commonly becomes infected and the patient suffers from frequent and painful micturition. When the sphincter ani is injured, there is incontinence of the feces.

Diagnosis. — The diagnosis of perineal tears can be made usually by inspection, but where there has been a submucous injury, or in cases where the mucous membrane of the vaginal wall and pelvic fascia have been injured without any very great injury to the skin, the appearance may be deceptive. In these cases by inserting the forefinger of each hand into the vagina and making traction gently downwards and outwards, it will be observed that the vaginal outlet is very much relaxed (Fig. 13).

In complete tears of the perineum the extent of the injury is evident from observation. The anus and the vagina form one opening. The sphincter ani is drawn out nearly to a straight line just below the anal opening. The retracted ends of the sphincter are marked by a dimple on either side of the anal opening. There is a history of incontinence of the feces. The extent of the tear up into the rectum may be readily determined by the introduction of one finger into the rectum and the thumb into the vagina.

Prophylaxis. — An important point in the consideration of injuries to the perineum is the means for their prevention. It is recognized that there is a certain percentage of cases in which tears in the perineum during labor are unavoidable, but there is a very large portion where, if proper precautions are taken, no injury will result.

Where the perineum has the proper degree of elasticity, its injury is always due to too great rapidity of delivery. This rapidity of delivery may be retarded in normal cases by the use of chloroform given in the last part of the second stage to almost or quite complete anesthesia. If no anesthetic is used the patient can be instructed to breathe rapidly during the height of each pain. When the patient breathes continuously it is impossible for her to fix the abdominal muscles. The chloroform partly or completely relaxes the abdominal muscles. In either instance the action of the abdominal muscles is eliminated and the pelvic floor has to withstand only the pressure due to the uterine contractions. The advance of the head under the pressure of the uterine contractions alone can be retarded by the hands over the occiput of the child and over the perineum. By these measures the delivery of the head can be delayed until the perineum is fully distended and the head can be delivered with the least danger to the perineum.

When the obstetric forceps are used the patient should be under complete anesthesia. Traction on the forceps should be made intermittently, and too much force should not be used. Time should be allowed for the complete distention of a perineum before the extraction of the head is attempted. The best obstetrician is not the one who can deliver a child with forceps most quickly, but the one who can deliver a living child with the least injury to the mother.

Treatment. — IMMEDIATE REPAIR. — All injuries to the perineum and vaginal walls occurring during labor should be repaired immediately. The labia should be separated widely and then, beginning at the highest point of the tear in the vaginal wall, it should be brought together with stitches from side to side, put in at right angles to the vaginal wound. Each stitch should be tied as put in. After the tear in the vaginal wall is completely closed, two or three relatively shallow stitches through the skin will bring the external portion of the wound together. For the stitches in the vaginal wall catgut is the most satisfactory material. For the skin stitches chromosized catgut can be used with very good results, but any material may be used. Silkworm gut gives the patient a great deal of discomfort and should be avoided. If the tear has extended up into the rectum the rectal wall should be sutured first, taking care not to allow the edge of the mucous membrane to be turned up into the wound. The ends of the torn sphincter should be sought for and stitched together by two catgut sutures and these reinforced by two non-absorbable sutures which pass through the skin and through the ends of the sphincter. The remainder of the tear can be repaired as previously described, just as though the rectum and sphincter had not been injured.

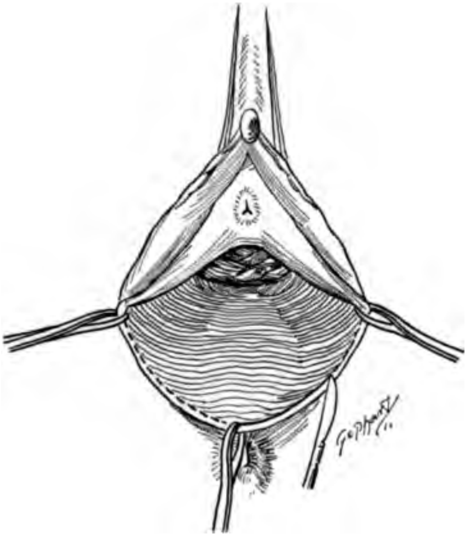


Fig. 15. — Flap-splitting Operation for Laceration of the Perineum. First step. The line along the muco-cutaneous border indicates the line of incision.

Late Repair. — Very many different forms of operation have been devised for late repair of the perineum and the pelvic floor. Only three of these operations will be described, — the flap-splitting operation, Emmet's operation, and Hegar's operation. For any of these operations the patient is prepared as described under operative technique and is put in the lithotomy position.

The Flap-splitting Operation. — Two points on either side of the vaginal outlet at about the level of the vulvo-vaginal glands are fixed by bullet forceps. Tension is made on these two points by the bullet forceps, and an incision is made from one fixed point to the other in the lower segment of the vaginal outlet along the border of the junction of the mucous membrane and the skin (Fig. 15). The mucous membrane is then dissected up from the floor of the vagina. It is usually necessary at the beginning of this dissection to clip with a knife or scissors the cicatricial bands about the outlet of the vagina, but when these are separated, the mucous membrane can be lifted from its attachment by blunt dissection as high as is necessary. The dissection must be carried sufficiently far laterally to uncover the torn portions of the levator ani muscle. The levator ani muscle and its fascia are then grasped by mouse-toothed forceps,

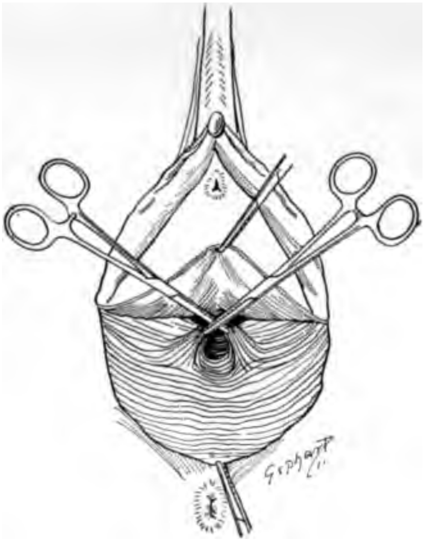


FIG. 16. — FLAP-SPLITTING OPERATION. Second step. The mucous membrane of the posterior vaginal wall has been elevated and the fascia on both sides has been seized by forceps and drawn up to be sutured.

brought into view (Fig. 16), and stitched together with catgut sutures over the rectum. This first line of sutures (Fig. 17), bringing together the fascia of the levator ani muscle, is the essential portion of the repair. Other interrupted sutures are put in above these to bring the raw surfaces together. A small portion of the superfluous mucous membrane is trimmed away. A purse-string suture, which is introduced at the point that is held by one bullet forceps, picks up the free edge of the mucous membrane at several points, and is brought out on the opposite side at the point held by the second bullet forceps. When this suture is tied the whole vaginal surface of the wound is covered with unbroken mucous membrane, the points held by the bullet forceps are brought together, and the mucous membrane of the vagina brought down to these points. This

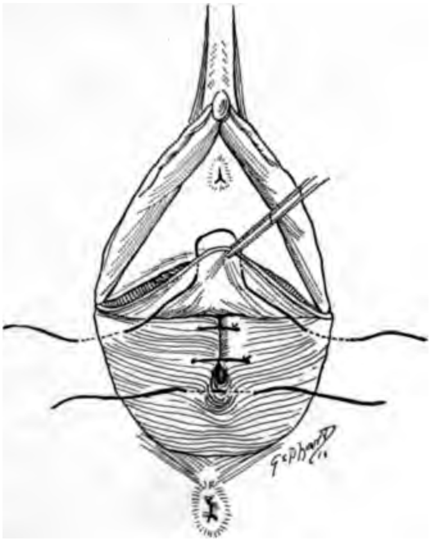


Fig. 17. — Flap-splitting Operation. Third step. Two sutures have been placed in the fascia and tied. The third one has been placed but not tied. The suture which brings together the upper angles of the wound and draws down the vaginal flap is also placed but not tied.

suture is then continued downwards, using a buttonhole stitch, and brings together the skin and tissues of the perineum just beneath the skin that have not previously been brought together by the buried sutures. Interrupted sutures may be substituted for the buttonhole suture. For the buried sutures, number three plain catgut is used. For the purse-string and the suture of the skin, number two chromosized catgut is used. The main advantages of this operation are that it reconstructs a firm pelvic floor, there is no loss of tissue, it is easily and quickly performed, and it is applicable to a very wide range of injuries.

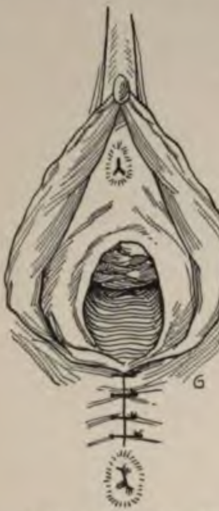


FIG. 18. — FLAP-SPLITTING OPERATION. Fourth step. All the sutures have been tied.

Emmet's Operation. — The points on the sides of the vaginal orifice near the opening of the duct of each vulvo-vaginal gland are fixed in exactly the same way as in the flap-splitting operation, and, in addition, with bullet forceps a third point is fixed in the median line of the posterior vaginal wall. This point in the median line should be sufficiently far forward on the vaginal wall so that it can be brought easily to the points held by the bullet forceps at the outlet of the vagina. It must be sufficiently far back in the vaginal wall so that when it is brought forward, all undue relaxation of the posterior wall is taken up. With a sharp knife the surface to be denuded is next outlined. The first line runs from the bullet forceps on one side of the vaginal outlet along the junction of the mucous membrane and the skin to the bullet forceps on the opposite side. Using the line running from the point of insertion of the middle forceps to the point held by one of the forceps at the vaginal outlet as a base, a triangle, with its apex as high in the vaginal sulcus as the vaginal tear extended, is marked out. The same sort of triangle is then outlined on the other side. These lines completely define the area to be denuded (Fig. 19). These outlines should always be drawn before any denudation is done. The mucous membrane is then lifted up by dissecting forceps and is cut away in strips with scissors until the entire area which is outlined has been denuded. Care must be taken not to leave any islands of mucous membrane.

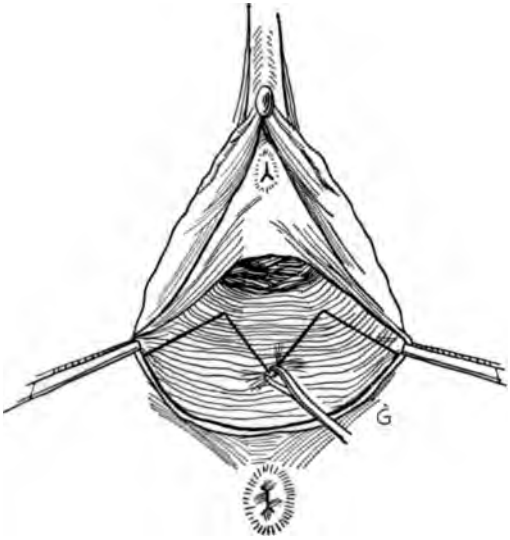


FIG. 19. — EMMET'S OPERATION FOR LACERATION OF THE PERINEUM. First step. The dark lines outline the area to be denuded.

In closing the wound, the beginning should be made at the upper angle of one of the triangular denudations. The sutures are passed in at right angles to the border of the denuded surface, carried downward to the bottom, and then upward on the other side, emerging at right angles to the border of denudation on the opposite side. Three or four sutures are usually sufficient to close up the denudation of each sulcus. When these are placed and tied, a suture is started through the skin at the point held by one of the bullet forceps. From here it is carried under the tongue of mucous membrane that is held by the bullet forceps in the floor of the vagina, and is brought out through the skin where the bullet forceps of the opposite side is attached (Fig. 20). When this suture is tied it brings together the three points originally held by the three bullet forceps. A small gap is left in the skin below this suture which is brought together by interrupted sutures (Fig. 21). For the suture material either silk, linen, or catgut can be used.

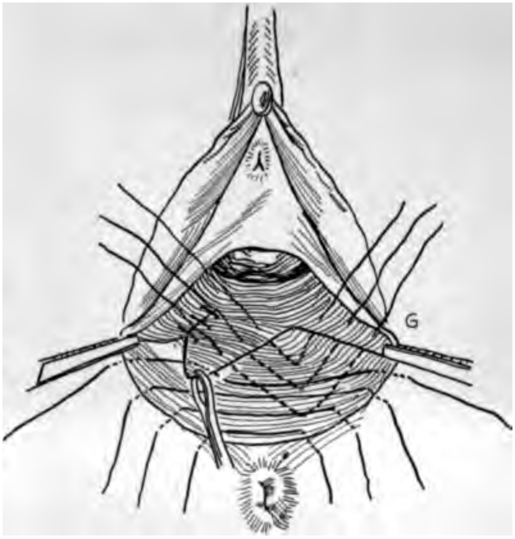


FIG. 20.—EMMET'S OPERATION. Second step. One triangular denudation is closed and the sutures tied. The sutures in the other angle are placed but not tied. The skin sutures are also in position.

Hegar's Operation. — Two points at the vaginal outlet near the orifices of the vulvo-vaginal glands are fixed by bullet forceps. On the posterior vaginal wall with a knife there is outlined a triangular area whose base extends along the junction of the skin and mucous membrane from one of these fixed points to the other, and whose apex is high up in the median line of the posterior vaginal wall. The mucous membrane within these outlines is then dissected off with scissors.

Closure of the wound should begin at the apex of the triangle of denudation on the posterior vaginal wall. The needle should be introduced at right angles to the edges of the wound and carried downward and inward to the median line. From this point it is carried upward and backward to the point opposite its insertion (Fig. 22). Each succeeding suture is introduced in the same manner. The result of passing the sutures in this way is to lift the floor of the pelvis upward and backward behind the symphysis. When the last suture in the vaginal wall is tied, it is found that nearly the whole of the denuded surface is closed. A few stitches through the skin complete the operation.

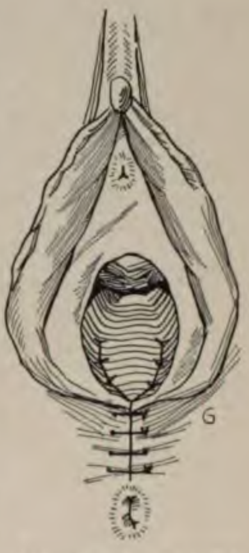


Fig. 21. — Emmet's Operation. Third step. All the sutures are tied.

Repair of Complete Tears of the Perineum. — In the repair of complete tears of the perineum the injury to the rectum must be repaired and the torn ends of the sphincter ani brought together. The edges of the torn rectum can be denuded either by splitting the recto-vaginal septum or by paring the torn edges. The splitting method is preferable because no tissue is destroyed. The rectum can be closed by either catgut or fine silk sutures. When silk is used, the suture should be introduced from the rectal side so that the knots are tied in the rectum. When catgut is used, the sutures should be put in from the upper side. They should not penetrate the entire thickness of the rectal wall. Care should be taken not to allow the edges of the mucous membrane to turn upward into the wound, because it will prevent union.

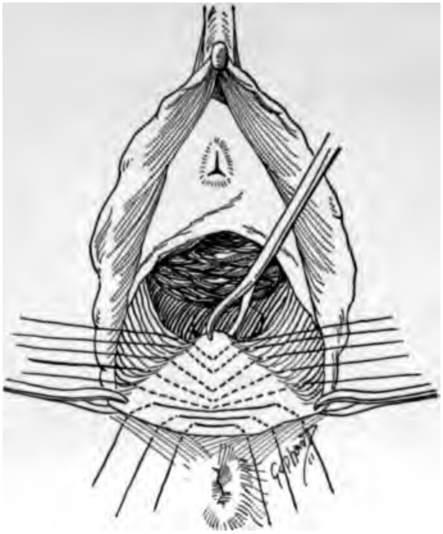


FIG. 22. — HEGAR'S OPERATION FOR LACERATION OF THE PERINEUM. The triangular unshaded area is the area that has been denuded. All the sutures have been placed but not tied.

The ends of the sphincter ani can be located by the little dimples in the skin produced by the retraction of the muscle. The muscle should be grasped between the thumb and fingers of each hand and stretched as far as possible. The ends of the sphincter are exposed by carrying incisions downward from the denuded surface of the recto-vaginal septum over the dimples and dissecting back the skin (Fig. 23). The ends of the muscle are caught with mouse-toothed forceps, drawn out, and sutured together with fine chromo-sized catgut (Fig. 24). These catgut sutures are reinforced by two non-absorbable sutures which are introduced through the skin and through the ends of the muscle. After the rectum and the sphincter are closed, the condition present and the judgment of the operator should decide whether the remainder of the perineal repair can best be completed by the flap-splitting, Emmet's, or Hegar's method.

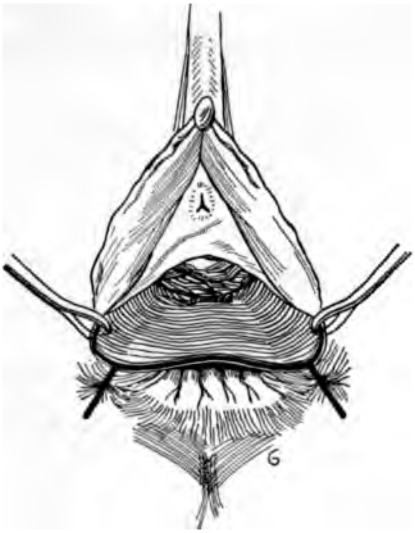


FIG. 23. — OPERATION FOR REPAIR OF THE SPHINCTER ANI. First step. The dark lines show the lines of incision. The long incision splits the septum between the rectum and vagina. The short incisions downward from this long incision are over the ends of the ruptured sphincter.

RECTOCELE

Rectocele is a prolapse of the posterior vaginal wall and the anterior rectal wall due to an injury to the recto-vaginal septum. It presents the appearance of a rounded mass projecting from the relaxed vaginal outlet. It is soft and easily pushed back by the examining finger. It can be distinguished easily from a cystocele, which it resembles in general appearance by the corrugations of the anterior vaginal wall near the meatus over the cystocele, and by the relation of the two to the vaginal canal. The examining finger passes into the vaginal canal above the rectocele but below the cystocele. Both rectocele and cystocele are frequently mistaken by patients for prolapse of the uterus.

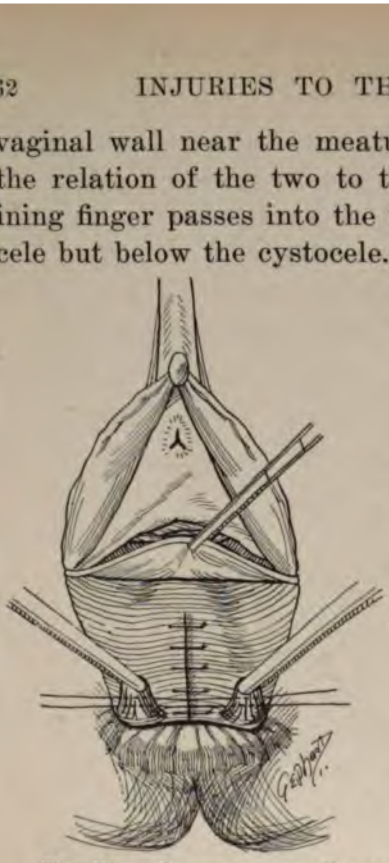


FIG. 24. — OPERATION FOR REPAIR OF THE SPHINCTER ANI. Second step. The tear in the rectum has been closed. The ends of the sphincter have been drawn up and the catgut sutures to bring them together are shown in position.

Treatment. — Any of the operations described for repair of the perineum will give good results in the treatment of rectocele.

CYSTOCELE

Cystocele is a prolapse of the bladder and anterior vaginal wall.

Pathology. — Cystocele is nearly always secondary to injuries to the pelvic floor received during labor. These injuries as a rule involve the pelvic fascia both anteriorly and posteriorly to the uterus. It is very commonly associated with retrodisplacement and prolapse of the uterus. When the bladder prolapses, a portion of it drops below the point of insertion of the urethra. As a result, these patients cannot completely empty the bladder and many of them suffer from a secondary cystitis. The friction of the clothing against the mucous membrane of the anterior vaginal wall produces a thickening of its epithelial cover and the formation of a horny layer of epithelium such as is found in true skin.

In rare instances primary carcinoma of the vagina develops in the prolapsed portion of the anterior vaginal wall.

Symptoms. — These patients complain of a rounded tumor pushing through the vaginal outlet. The friction of the clothing against the mucous membrane produces some discomfort. Frequent and painful urination due to the secondary cystitis are very constant and annoying symptoms.

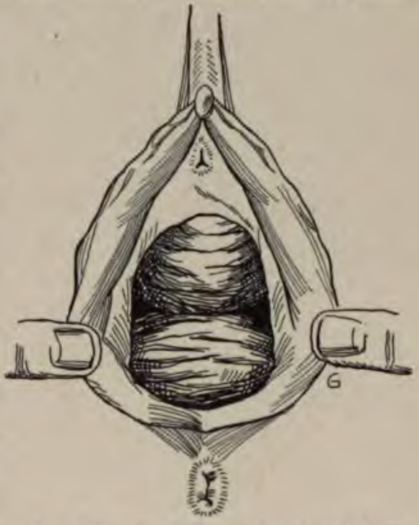


FIG. 25. — CYSTOCELE AND RECTOCELE.

Diagnosis. — A cystocele presents a rounded mass projecting through the relaxed vaginal outlet. It apparently increases in size when the bladder is distended, when the patient is on her feet, or when there is any increase of intra-abdominal tension. The corrugations on the anterior vaginal wall just below the meatus are very distinct. The tumor is soft, presents very little resistance to the finger on examination, and can be easily pushed up out of view. The examining finger passes into the vagina beneath the tumor. A curved sound introduced through the urethra into the prolapsed bladder can be easily felt through the anterior vaginal wall.

Treatment. — Operation for the relief of cystocele is nearly always undertaken in connection with operations for other conditions, especially for retrodisplacement or prolapse of the uterus.

A transverse incision is made in the mucous membrane of the anterior vaginal wall just below the lowest point to which the bladder comes. A perpendicular incision is carried from the middle of this line up the vaginal wall to a point near the meatus. With a piece of gauze covering the forefinger the bladder is separated from the uterus and from the anterior vaginal wall (Fig. 27). The bladder is pushed up to its normal level. The superfluous vaginal wall on either side of the perpendicular incision is cut away. One or two stitches are then put in the upper angle of the wound through the vaginal wall only. Immediately below these, two number three chromosized catgut stitches are passed through the vaginal wall on one side, then into the uterus near the internal os, and out through the vaginal wall on the opposite side. When these two stitches are tied they bring the vaginal wall and the uterus in apposition

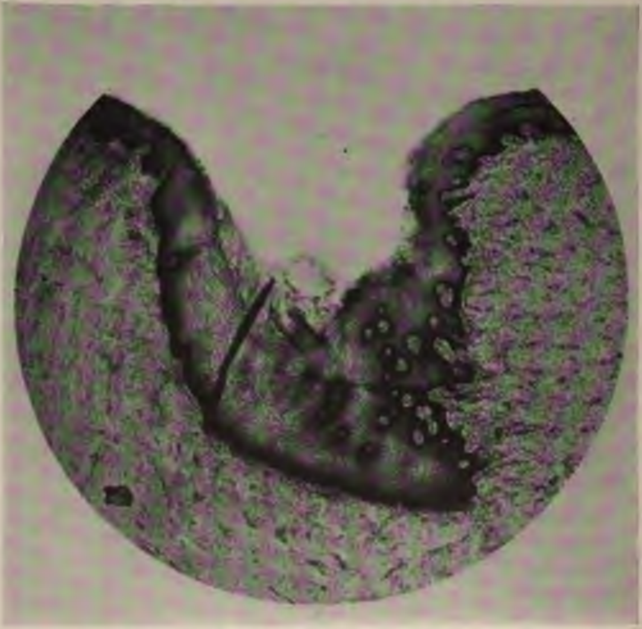


FIG. 26. — THICKENED VAGINAL EPITHELIUM. (Photomicrograph.) Thickened vaginal epithelium of this character is found in all cases of prolapse of the anterior vaginal wall of long standing.

and entirely close up the space into which the bladder had prolapsed. The remainder of the wound in the vaginal wall is closed by a running catgut suture.

A somewhat more radical procedure is adopted when operating upon women who have passed the menopause.

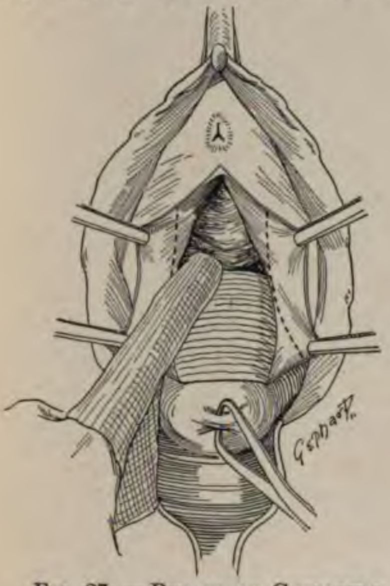


FIG. 27. — REPAIR OF CYSTOCELE. First step. The anterior vaginal wall has been opened by an inverted T-shaped incision and the bladder is separated from the uterus and from the anterior vaginal wall by blunt dissection. The dotted lines on the flaps indicate the excess anterior vaginal wall to be cut away.

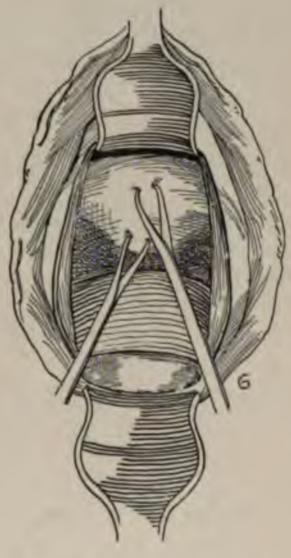


FIG. 28. — REPAIR OF CYSTOCELE. Second step. The fundus of the uterus is being drawn forward by bullet forceps.

The operation is started in the way just described, but the dissection is carried through the peritoneum between the bladder and the uterus. The fundus of the uterus is turned forward (Fig. 28) and stitched to the vaginal wall high up (Fig. 29). This puts the bladder on a plane entirely above the uterus and effectually prevents a recurrence of the prolapse. Without reference to the age of the patient, some operators prefer this more radical operation in all cases in which the cystocele is large; but whenever the fundus of the uterus is stitched to the vaginal wall in a patient who has not arrived at the climacteric, the tubes must be resected to prevent a possible pregnancy. In all cases the perineum should be repaired.

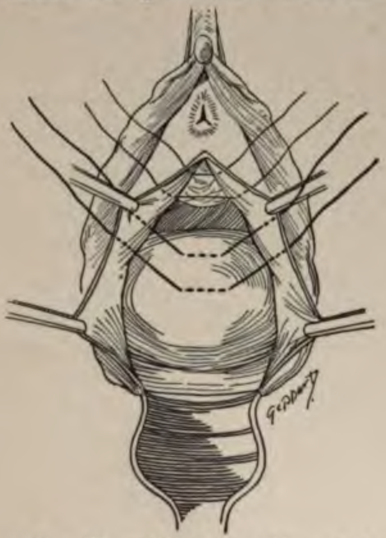


FIG. 29. — REPAIR OF CYSTOCELE. Third step. Shows the methods of placing sutures to attach the fundus of the uterus to the anterior vaginal wall.

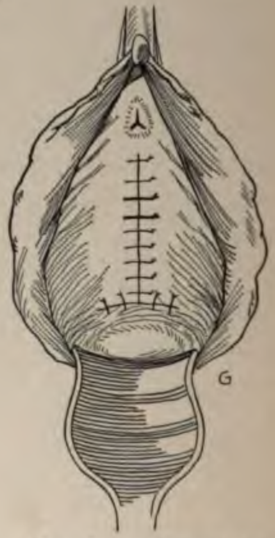


FIG. 30. — REPAIR OF CYSTOCELE. Fourth step. The operation completed.

Many operations for cystocele have been proposed, but any operation that does not eliminate the space between the anterior vaginal wall and the uterus into which the bladder prolapses will never keep the bladder in its proper position.

RECTO-VAGINAL FISTULA

A recto-vaginal fistula may be due to the failure of a complete rupture of the perineum to unite after an attempted repair; or it may be due to the breaking down of a malignant growth or some other ulceration. There is more or less escape of gas from the rectum. If the fistula is small and the bowels are constipated, there is very little tendency for the feces to pass through it; but when the fistula is large, and especially if the bowels are loose, there is an escape of feces into the vagina.

Treatment. — When the cause of a recto-vaginal fistula is other than a traumatic one the cause must be treated before any attempt at repair is undertaken. In the traumatic cases when the opening is well above the sphincter the edges of the fistula can be split and the rectal and vaginal wall sewed up separately. When the fistula is very low down it is usually better to cut through all the perineal tissues up to the fistula, denude its edges and repair the perineum as though there had been a complete tear in the perineum.

CHAPTER VI

URINARY FISTULÆ

A fistula is an abnormal opening between two natural cavities of the body, or leading from one of the natural cavities of the body to the outside. Urinary fistulæ considered here are abnormal openings leading from some portion of the urinary tract into some portion of the genital canal.

Varieties. — The simplest method of classifying the urinary fistulæ is an anatomical one. Beginning below, there is a urethro-vaginal, a vesico-vaginal, a vesico-utero-vaginal, a vesico-uterine, and a uretro-vaginal (Fig. 31).

Etiology. — Delay in the descent of the head in the second stage of labor is the most frequent cause of vesico-vaginal and vesico-uterine fistulæ. The bladder and anterior vaginal wall or cervix are caught between the head and the symphysis. The tissues are crushed until the blood supply is destroyed. A few days afterward the devitalized tissues slough, leaving an opening from the bladder into the vagina or uterus. Occasionally in a rapid labor a distended prolapsed bladder will be caught between the descending head and the symphysis, and an opening will be torn in it and the anterior vaginal wall by the pressure from above.

Accidental injuries to the bladder or one of the ureters during operative work may result in a fistula. The ureters are more often injured during operation than is the bladder. The injuries to the bladder and ureters occur most frequently during operations for the removal of the uterus for malignant growths, the reason being that in these operations an attempt is made to remove as much tissue that is contiguous to the uterus as possible, and the bladder or ureter is injured in the removal of tissue at some distance from the uterus.

An opening may be accidentally made in the urethra during an operation for cysts of the anterior vaginal wall, or in draining a suburethral abscess.

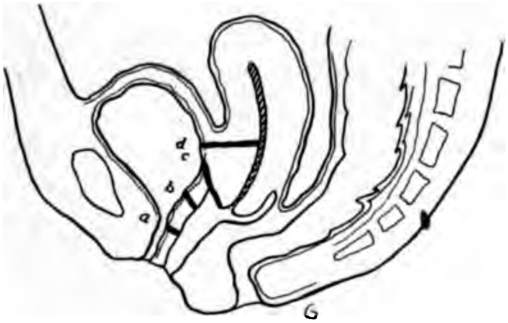


FIG. 31. — DIAGRAM SHOWING LOCATION OF URINARY FISTULÆ. *a*, Urethro-vaginal fistula; *b*, vesico-vaginal fistula; *c*, vesico-utero-vaginal fistula; *d*, vesico-uterine fistula.

URETHRO-VAGINAL FISTULA

Urethro-vaginal fistula is rarely seen, because when it occurs as the result of injury it usually closes spontaneously.

Symptoms. — During urination the urine instead of escaping from the meatus escapes through the opening in the anterior vaginal wall, but as the defect in the urinary tract is below the sphincter of the bladder, there is no incontinence.

Treatment. — The fistula is exposed by retracting the perineum. The edges of it are pared, a silver catheter is passed into the urethra to preserve its calibre, and the pared edges are brought together by fine interrupted sutures.

VESICO-VAGINAL FISTULA

A vesico-vaginal fistula is an opening from the bladder into the vagina. It is the most common form of all the urinary fistulæ. It may be no larger than a pin-hole, or the whole vesico-vaginal septum may be sloughed away.

Pathology. — In exceptional cases there is a clean tear in the base of the bladder and anterior vaginal wall. In most instances an area of pressure necrosis takes place which may leave a very small opening, or nearly the whole vesico-vaginal septum may slough away. The external genitals are kept constantly wet by the escaping urine. The urine decomposes, and the products of decomposition act as irritants to all the structures with which they come in contact. There is a formation of ammonia compounds. Vulvitis, vaginitis, and cystitis are frequent complications. Usually phosphates are deposited about the fistulous opening. These deposits accumulate particularly in any ulcerated area in the bladder, in the fistula, or in the vagina.

Symptoms. — There is a continuous dribble of urine from the vagina. When the fistula follows labor and is due to a tear in the bladder, the escape of urine begins immediately. When it is due to the separation of a slough from pressure, the urine begins to escape from three to ten days after the labor. There is a strong ammoniacal odor due to the decomposition of the urine. The associated infections of the vulva, vagina, and bladder cause much pain and burning about the external genitals. When the fistula in the bladder is a considerable distance above the vesico-urethral opening the patient when in the erect position may retain a small amount of urine in the bladder. In some instances a moderate amount of urine may be retained temporarily when the patient is recumbent.

Diagnosis. — The opening in the anterior vaginal wall can usually be felt on making a digital examination of the vagina. When the fistula is so small that it cannot be readily detected by the finger, a bland colored fluid, such as a weak solution of methyline blue or milk, may be injected into the bladder. The point at which the fluid escapes into the vagina will locate the fistula.

Treatment. — Before an attempt is made to repair the opening in the vesico-vaginal septum, it is essential to get the tissues in the region of the fistula as free from infection and into as nearly a normal condition as possible. The larger deposits of phosphates can be removed mechanically. The infected and ulcerated areas are painted over with a solution of nitrate of silver. Benzoic acid administered in ten-grain doses every four hours renders the urine acid, stops the further precipitation of phosphates, and assists in the removal of deposits of phosphates already present. It also exerts a beneficial action upon the infected areas about the fistula.

In operating for vesico-vaginal fistula, one of two methods are used for paring the edges of the fistula. The edges may be caught up by a tenaculum and a strip of mucous membrane surrounding the whole circumference of the fistula may be removed with scissors. Another method is to split the edges of the fistula with a knife (Fig. 32) and dissect the bladder and vaginal walls from each other for a half inch in all directions surrounding the fistula. By this method no tissue is removed. The bladder wall is then brought together by fine chromosized catgut, after which the vaginal wall is brought together by the same kind of sutures (Fig. 33). In placing the sutures in the bladder wall they should be placed in such a way as to make the edges of the mucous membrane pouch forward a little into the bladder and not down into

Symptoms. — The symptoms produced by vesico-uterine fistula are similar to those of vesico-vaginal fistula. The opening in the bladder is higher up, and patients are sometimes able to retain a moderate amount of urine in the bladder and in some cases even to pass some through the urethra. But as soon as the urine reaches the level of the opening it begins to discharge through the cervical canal. The diagnosis is made by injecting into the bladder a colored fluid which can be seen to escape through the external os.

Treatment. — A transverse incision is made in the anterior vaginal wall just in front of the cervix. The dissection is carried upward separating the uterus from the bladder. This dissection is rendered difficult by the cicatricial tissue around the fistula. The opening in the bladder is then brought together by fine chromosized catgut sutures and the wound in the anterior vaginal wall is closed.

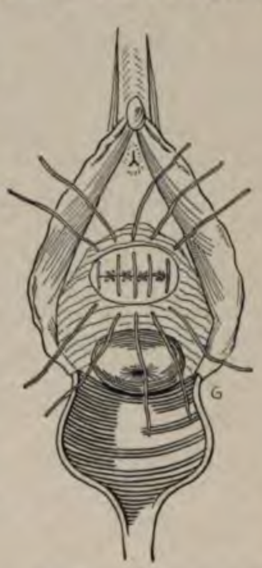


Fig. 33. — Repair of Vesico-vaginal Fistula. Second step. The wall of the bladder has been brought together and the sutures tied. The sutures for bringing the vaginal wall together are in position.

URETERO-VAGINAL FISTULA

A uretero-vaginal fistula is an opening from one of the ureters into the vagina. They are usually the result of accidental injuries to the ureters during an operation.

Symptoms and Diagnosis. — There is a continuous dribble of urine from the vagina. At the same time the bladder fills from the uninjured ureter and is emptied normally. A colored fluid injected into the bladder does not escape into the vagina. Which ureter is injured can usually be determined by inspecting the site of the flow of urine. A uretral catheter will pass from the bladder into the uninjured ureter, but will not pass into the injured one.

Treatment. — When the ureter has been injured very low down, it is sometimes possible by a vaginal operation to implant the broken ureter into the bladder at some point higher than normal. Ordinarily, however, it is necessary to perform an abdominal operation to join the two ends of the ureter together or to implant the ureter into the bladder. When the injury to the ureter is a very recent one it may be possible to make a direct uretral anastamosis. The bladder end of the ureter is closed at its outer extremity by a ligature. A slit is then made in its side and the distal end of the ureter is introduced into this slit and secured by fine sutures. A drain should be put from Douglas' cul-de-sac through the posterior vaginal wall to relieve any temporary leakage. In many instances the lower fragment of the ureter is too short to use in this way.

Frequently in secondary operations, on account of adhesions and cicatrices, it is not possible to find the lower fragment of the ureter. When this is the case, or when from any other cause it is impracticable to attempt to unite directly the separated uretral fragments, the next best operation when it can be done is to implant the severed ureter into the bladder wall. An incision in the median line of the abdomen long enough to give plenty of room should be made. The bladder must be freed from all adhesions and made as mobile as possible. The severed ureter is isolated to a point above the brim of the pelvis.

A sound is then introduced into the bladder through the urethra and that point in the bladder selected which can be brought to the end of the ureter with the least tension on the bladder and on the ureter. A small opening is then made into the bladder at this point and the end of the ureter introduced through it and stitched to the bladder either by fine silk or fine catgut. All raw surfaces should be covered over with peritoneum as far as possible. A drain should be left in the pelvis to remove any leakage. The abdominal wound is closed in the ordinary way.

CHAPTER VII

DISEASES OF THE URETHRA AND BLADDER

URETHRAL CARUNCLE

An urethral caruncle is a small growth that occurs usually in the floor of the meatus (Fig. 34). Ordinarily it is pedunculated and grows from a very narrow base. In other cases its base spreads out over half or two-thirds of the circumference of the meatus. It is bright red in color, has a very free blood supply, and some of them are covered with many layers of stratified squamous epithelial cells. Under the microscope many of them present the appearance of extremely vascular papillomata. In some the presence of glands can be easily demonstrated (Fig. 35). They grow very slowly, never attain a very large size, and frequently recur after removal.

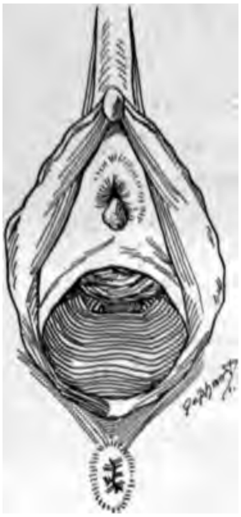


FIG. 34. — URETHRAL CARUNCLE.

Symptoms. — They cause pain on urination, and are so extremely sensitive even to very slight pressure that the patient has a great deal of pain if the clothing comes in contact with them or when there is any other source of irritation. The constant irritation and pain so affects the general nervous system of many of these patients that they are entirely unfitted for the pursuit of any occupation.

Diagnosis. — The diagnosis is easily made. A small red growth which is extremely sensitive to touch is seen protruding from the meatus.

Treatment. — The treatment consists of the complete excision of the base of the growth. The wound is brought together by fine stitches. In some cases where the base of the growth is broad it can be dealt with more satisfactorily by the use of the cautery. These operations are very slight, but on account of the extreme sensitiveness of these growths and the nervous condition of the patient it is usually best to operate under a general anesthetic. For a few days after the operation it is best to keep the urine alkaline by the administration of potassium acetate or some similar salt.

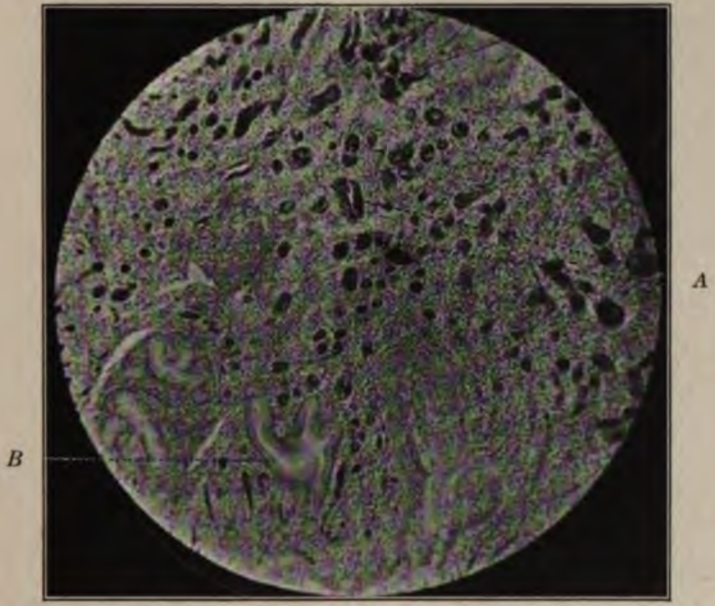


FIG. 35. — URETHRAL CARUNCLE. (Photomicrograph.) A few glands and numerous blood-vessels are shown. *A*, blood-vessels; *B*, glands.

URETHRITIS

The term " urethritis " includes all forms of urethral inflammation. Cases of urethritis not due to gonorrheal infection are rare. Other forms of urethritis are chiefly interesting from the standpoint of etiology, since in symptoms and treatment they correspond with some of the stages of the more common disorder.

The disease is more common between the ages of puberty and the menopause, but is also seen in children and in old persons. In the acute stages there is usually an associated infection of the vulva and the vagina. Chronic or subacute urethritis is more frequently seen than the acute. This is largely due to the fact that many patients suffering from an acute gonorrheal urethritis are not examined.

Pathology. — In the acute stage the anatomical changes in the urethra are those of a high grade of inflammation. During the height of the inflammatory process the meatus is red and swollen and covered with a thin muco-purulent secretion. In this secretion the gonococci may be found in varying numbers. Sooner or later the glands in the anterior part of the urethra become infected and minute drops of pus may be seen exuding from the dilated orifices. Through the endoscope, the most marked reaction to the infection is observed to extend a short distance back from the meatus, to be less intense near the middle of the urethra, and in many cases to resume a marked intensity near the internal orifice.

The inflammation reaches its height about the seventh or eighth day and then begins to subside. After this the mucosa gradually loses its intense red color and edematous appearance. The pus diminishes and the number of gonococci decreases. Complete resolution does not as a rule take place until after the fourteenth day. If the inflammatory process has been particularly severe, resolution may be delayed for a much longer period. Complete resolution may not take place and the disease may pass on into the chronic stage. This stage is characterized by small elevated and congested cone-shaped areas that are sensitive and bleed easily. Scattered over the mucosa small ulcers may be seen. The ulcers secrete a thin muco-purulent material which is composed of pus cells, epithelial cells, and a few gonococci. These ulcers show little or no tendency to heal spontaneously and may stubbornly resist all forms of treatment.

The glands of Skene are frequently involved, and here the disease is particularly apt to linger in a chronic form. When these glands have become infected, pus may be milked out of them by pressure from above downwards. By this milking process one or two drops of thick pus may often be made to exude from the orifices of the ducts just inside of the urethra, giving evidence of its source by adhering to the side from which it was squeezed. Long after a gonorrheal infection has apparently subsided a general reinfection may occur from gonococci that have lingered in these glands.

Symptoms. — In the stage of invasion there is a slight tickling and burning sensation and some sero-mucous discharge. As the inflammatory process increases there is a more or less burning sensation in the urethra which is very much increased on urination. If the infection involves the outlet of the urethra from the bladder, the urination becomes frequent. The patients will often hold their urine for hours to escape the burning and pain produced by the flow of urine over the infected mucous membrane. A slight rise of temperature may be noted. When the acute stage of the infection subsides the urination becomes less painful. In the chronic cases there may be no discomfort or there may be a slight burning on urination.

Diagnosis. — As a rule the diagnosis is easy. The urethral orifice is often observed to be red and swollen and has a purulent discharge escaping from it. By inserting the finger-tip into the vagina the urethra is found to be swollen and tender, and pressure from behind forward causes pus to escape from the meatus. In the chronic stage, by examination with the urethroscope small ulcers or congested areas can be seen. With the microscope, pus cells, epithelial cells, and gonococci are found in the discharge.

Treatment. — In the acute stage of the disease no local treatment should be given. The external genitals should be bathed frequently with mild antiseptic solutions, such as bichloride, one to six thousand, or a saturated solution of boric acid. A hot sitz-bath may be used. Rest in bed is very desirable. The diet should be light and non-stimulating. Large quantities of fluids should be drunk. The bowels should be kept loose with saline purgatives. For the burning and scalding urination, potassium acetate in twenty-grain doses four times daily usually gives the greatest amount of relief. As soon as the inflammation has somewhat subsided, intra-urethral applications of protargol, one per cent, or nitrate of silver solution, one per cent are used daily. As the inflammation further declines the strength of the solution is increased gradually up to two or three per cent. Generally under this treatment the gonococci rapidly disappear and the discharge becomes less. After the gonococci have disappeared the protargol or nitrate of silver solutions should be discontinued. The process of healing may be further aided by injecting a mild solution of zinc sulphate every third day until the mucoid discharge ceases.

In the chronic stage injections will not improve the condition. The only satisfactory method is to expose the ulcerated or congested parts by means of an endoscope, and directly apply to these infected parts a solution of silver nitrate, twenty grains to the ounce, every three to five days until the ulcers have healed. Skene's glands when involved should be emptied daily by pressure from above downwards on each side of the urethra. If there is a chronic diffuse inflammation about these tubules, they should be opened from the vaginal side and the lining mucous membrane cauterized with a stick of nitrate of silver, carbolic acid, or the actual cautery.

STRICTURE OF THE URETHRA

In women, stricture of the urethra following urethritis is rare. The symptoms are not particularly characteristic. There is usually a history of painful urination which has extended over a long period of time.

The diagnosis is made by determining the calibre of the urethra by the introduction of sounds.

Treatment. — The urethra should be thoroughly dilated under an anesthetic. The proper calibre is afterwards maintained by the passage of sounds every few days until the healing is complete.

SUB-URETHRAL ABSCESS

A sub-urethral abscess is secondary to an infection of the urethra.

Symptoms. — There is pain in the neighborhood of the urethra, and a sense of fullness in the vagina. In some cases there is a marked rise of temperature.

Diagnosis. — If a metal catheter is introduced into the urethra and one finger into the vagina, a fluctuating mass can be felt between the two. The vaginal wall is apparently thickened. These signs, with the history of the rapid formation of the tumor and a history of a previous urethritis serve to complete the diagnosis.

Treatment. — Open the abscess freely through the anterior vaginal wall and drain it.

PROLAPSE OF THE URETHRA

Prolapse of the urethra is most common in children, but is occasionally seen in debilitated women.

Symptoms. — The symptoms are painful urination and the discomfort arising from the prolapsed urethra coming in contact with the clothing. The prolapsed portion presents a circular protrusion of a bright red color with the opening of the urethra in the center.

Treatment. — When the condition is acute the patient should be kept in bed, the prolapse reduced, and if a cause can be found, it should be removed. In long standing cases the protruding portion of the urethra should be excised. The circular wound is closed and the continuity of the urethra restored by a number of fine interrupted catgut sutures.

OVER-DISTENTION OF THE URETHRA

Over-distention of the urethra may result from too widely dilating the urethra in attempting to remove stones or other foreign bodies from the bladder, but exceptionally it results from other conditions.

Symptoms. — When the sphincter of the bladder is not damaged there is practically no discomfort. When the vesicle sphincter has been over-distended there is incontinence of urine.

Diagnosis. — When there is incontinence of urine due to over-distention it will usually be found that the urethra is sufficiently large to allow the introduction of one finger or a sound much larger than ordinary into the bladder.

Treatment. — The treatment of these cases is extremely unsatisfactory, because the lesion that gives the real difficulty is the loss of contraction in the vesicle sphincter. Usually it is not possible to restore the sphincter. Attempts have been made to reduce the calibre of the urethra by dissecting it loose nearly its entire length, giving it a half turn on its long axis, and then fixing it in this position with sutures. The same result is reached by resecting the floor of the urethra and suturing it together over a small metal catheter.

URETHROCELE

This is a circular dilatation in the middle portion of the urethra that is usually due to a narrowing of the meatus. It presents the appearance of a rounded projection in the anterior vaginal wall. A sound introduced into the urethra through the meatus can be felt by the finger through the anterior vaginal wall within this dilated portion of the urethra.

There is always some retention of urine, and as a result of the failure of drainage a portion of the urethra becomes infected. The mass is tender on pressure. Very commonly a small amount of pus can be expressed from the meatus by pressure through the anterior vaginal wall.

Treatment. — If the obstruction that is causing the dilatation is a stricture it should be thoroughly stretched. If the obstruction is a new growth it should be removed. If after the removal of the obstruction the patient continues to have symptoms, the anterior wall of the vagina can be opened and the dilated portion of the urethra can be resected.

VESICO-URETHRAL FISSURE.

This is a small fissure occurring at the urethro-vesicle junction.

Etiology. — The causes of it are not definitely known, but are supposed to be associated with injuries received during labor or infections of the urethra and bladder.

Symptoms. — The symptoms are a constant desire to urinate, extreme tenesmus, and burning pain associated with urination. The discomfort is not relieved by emptying the bladder.

Diagnosis. — The diagnosis can only be made by inspection with the cystoscope.

Treatment. — Dilate the vesical orifice. This dilatation should not extend beyond half an inch in diameter. Acetate of potash should be administered to render the urine bland.

EXSTROPHY OF THE BLADDER

There are a number of congenital defects of the bladder, but the one of greatest importance on account of its relative frequency is exstrophy of the bladder.

In this condition the anterior bladder wall and its coverings are absent and the mucous membrane of the posterior bladder wall is exposed and presents a red, fungous-looking surface. The orifices of the ureters can sometimes be seen. There being no anterior bladder wall, there is necessarily no reservoir to contain the urine and it escapes directly from the ureters over the external surfaces. The urine decomposes and produces excoriations. There is a tendency to the deposit of phosphates.

Treatment. — There are such wide variations in the size of the defective areas that it is not possible to give any general line of treatment that is applicable to all cases. Where the defect is small, it may be possible to reconstruct the bladder and the abdominal wall by a plastic operation. Where the defect is so large that this cannot be done, the entire treatment consists in palliative measures to reduce the inconvenience from the constantly escaping urine.

CYSTITIS

Inflammation of the bladder in women is an extremely common disease. It may occur either as an acute or chronic condition.

Etiology. — Pathogenic bacteria reach the bladder by being carried in on a catheter more frequently than in any other way. Very often the catheter becomes infected by coming in contact with the labia during its introduction. Catheterization should always be done by sight and not by touch. The catheter should be sterilized and the hands of the person using the catheter should be thoroughly washed. The vestibule and the neighboring portions of the vulva should be wiped off with cotton saturated with one to four thousand bichloride of mercury solution. The labia minora should be separated by the thumb and fingers of one hand and the catheter introduced into the urethra and not allowed to come in contact with the labia. Any kind of catheter may be used, but a soft-rubber catheter is generally the most satisfactory.

The bladder is frequently infected by direct continuity from an infected urethra. The retained urine in the prolapsed portion of the bladder when a cystocele is present forms an excellent culture medium for bacteria and many of these patients suffer from cystitis. Practically the same condition exists in patients who have had an over-distention of the bladder from any cause. Foreign bodies in the bladder nearly always have a cystitis associated with them. The bladder may be infected from the kidney either when the kidney is infected or by the healthy kidney allowing pathogenic bacteria to pass through it which find a lodgment in the bladder.

Cystitis may result from the adhesion of an infected Fallopian tube to the bladder wall. The infection passes directly through the wall of the tube and the wall of the bladder. This may happen when there is any other infection near the bladder. Of all these causes the careless use of the catheter is the most prolific.

Pathology. — The portion of the bladder most frequently infected is a little triangular area bounded by the three lines that connect the orifices of the ureters and the vesicle outlet. The mucous membrane is red and swollen and may be covered with mucus or pus. Erosions of the epithelium occur which may result in the formation of ragged irregular ulcers. The frequent contractions of the bladder result in muscular hypertrophy. The bladder capacity may be reduced to one or two ounces.

The pathogenic bacteria most frequently found are the bacillus coli communis, gonococcus, and bacillus tuberculosis. Quite a variety of other micro-organisms are occasionally present. The gonococcus and bacillus tuberculosis are the most important, since these organisms will attack the healthy bladder in the absence of any predisposing cause. On the other hand the normal bladder offers so much resistance to the other bacteria that ordinarily they do not become active except under favorable conditions.

Symptoms. — There is frequent and painful urination. The pain and tenesmus are not relieved by the evacuation of the bladder. In many cases there is more or less constant pain in the region of the bladder.

Diagnosis. — There is usually a history of a urethritis or of the use of the catheter. By bimanual examination the base of the bladder is found to be tender and painful on pressure. The urine may be clear, but is more frequently cloudy. The cloudiness is due to the presence of either pus, mucus, blood, or broken-down epithelium. By microscopic examination all these may be found. The reaction to litmus is nearly always acid. Occasionally in the cases where a cystocele is present the urine may be alkaline in reaction. In the chronic cases, by the aid of the cystoscope the infected areas can be directly inspected.

Treatment. — One of the most valuable therapeutic agents in the treatment of all forms of cystitis is water. The patient should be encouraged to drink as much water as possible. Ten grains of benzoic acid in combination with ten grains of biborate of sodium should be given every four hours. The value of benzoic acid in cystitis depends not so much upon its rendering the urine acid as upon its direct antiseptic properties. Other valuable urinary antiseptics are urotropin and similar compounds. Urotropin is more easily administered, but the results from benzoic acid are very much more certain.

In the chronic cases and occasionally in the acute cases benefit is derived by the irrigation of the bladder with normal salt solution or saturated boracic acid solution. Many cases are entirely relieved by a thorough dilatation of the whole length of the urethra. In very obstinate cases the bladder may be irrigated with a solution of one to two grains of nitrate of silver to the ounce. The excess should be washed out with plain water or with normal salt solution. Localized infections and ulcerated areas should be treated by the direct application of a strong solution of nitrate of silver applied through the cystoscope.

In cases where there has been hypertrophy of the bladder wall and a marked contraction of the bladder, its retaining capacity can be increased by gradual dilatation by hydrostatic pressure. A catheter is passed into the bladder. This is connected by a rubber tube to an elevated funnel. Normal salt solution is passed in through the funnel until the bladder is filled to a capacity that gives distinct discomfort. After the bladder has been kept distended for a few minutes the water is allowed to escape and the process is repeated. By keeping this treatment up daily for a considerable length of time, very marked gain in bladder capacity can be made. Where other means of treatment have failed an artificial vesico-vaginal fistula should be made. The fistula should be made in the median line to avoid the orifices of the ureters and far enough posteriorly to avoid the urethral opening. The incision should be about one inch long. To keep it open the mucous membrane of the bladder should be stitched down to the mucous membrane of the anterior vaginal wall. After the cystitis has subsided this fistula may be closed.

VESICAL CALCULUS

Stone in the bladder is very much less frequent in women than in men. They are usually of the phosphatic variety, and in the majority of cases are due to the retention in the bladder of some foreign body. Small uric acid calculi coming down from the kidney nearly always escape through the short patulous urethra. The formation of stone sometimes follows operations for vesico-vaginal fistula. In that case they are usually phosphatic stones that form around a non-absorbable stitch that has penetrated the mucous membrane of the bladder. They more commonly result from the lodgment in the bladder of some foreign body that has been accidentally introduced through the urethra.

Symptoms. — The symptoms are those due to the associated cystitis. In exceptional cases there will be sudden blocking of the urine by the foreign body obstructing the urethral outlet.

Diagnosis. — The stone or other foreign material in the bladder can easily be felt by bimanual examination. If a metal catheter or sound is introduced into the bladder it can be felt to strike some solid body and a distinct click is elicited.

Treatment. — As has already been suggested, small stones in the bladder usually escape of their own accord, or they may be removed by forceps after a moderate dilatation of the urethra. The larger stones can be most safely and easily removed by way of an incision through the median line of the anterior vaginal wall and the base of the bladder. The incision should avoid the ureteral and urethral openings into the bladder. Since these patients nearly always have a cystitis, it is usually best to make no attempt to close up the incision at the time. If the patient is treated for the cystitis, usually by the time the inflammation in the bladder is relieved the fistula will have closed of itself. If it has not, it may be closed by a slight plastic operation.

CHAPTER VIII

THE UTERUS

ANATOMY

The uterus is divided into a body and a cervix. In the virgin these are of about equal length, but in women who have borne children the body is nearly double the length of the cervix.

Body of the Uterus. — The body is pyriform in shape and somewhat flattened from before backwards. Its size varies considerably within normal limits; ordinarily it is about one inch and a half long and about the same in breadth and one inch in thickness. The closed end or fundus of the uterus is dome-shaped. The walls are made up of a serous, a muscular, and a mucous layer. The *serous* coat is a reflection of the peritoneum and covers the entire anterior and posterior walls of the body. From the sides it passes outward to form the broad ligaments; behind it passes downward over the supravaginal portion of the cervix. In front it is reflected from the lower part of the anterior wall upward over the bladder. The *muscular* layer forms the mass of the uterine wall. The fibers run circularly, longitudinally, and diagonally, but they are so intimately intertwined that it is difficult to demonstrate them.

The anterior and posterior walls of the body of the uterus lie in contact with each other. The internal surfaces of both walls are triangular in shape. The base of the triangle is upward and the angles correspond to the openings of the Fallopian tubes; the apex points downward and is continuous with the cervical canal. The cavity of the uterus is lined with a mucous membrane — the *endometrium*. Three distinct types of cells are found in the endometrium. The bulk of the tissue is made up of ovoid embryonic connective tissue cells. Just around the glands are a few of these cells that have assumed a spindle shape. Scattered among the ovoid cells are a few small round or lymphoid cells. These round cells occur either singly or in small definitely outlined groups. The surface of the endometrium is covered with a single layer of low columnar epithelium. The nuclei are near the middle of the cells. Penetrating the endometrium are numerous tubular glands which are

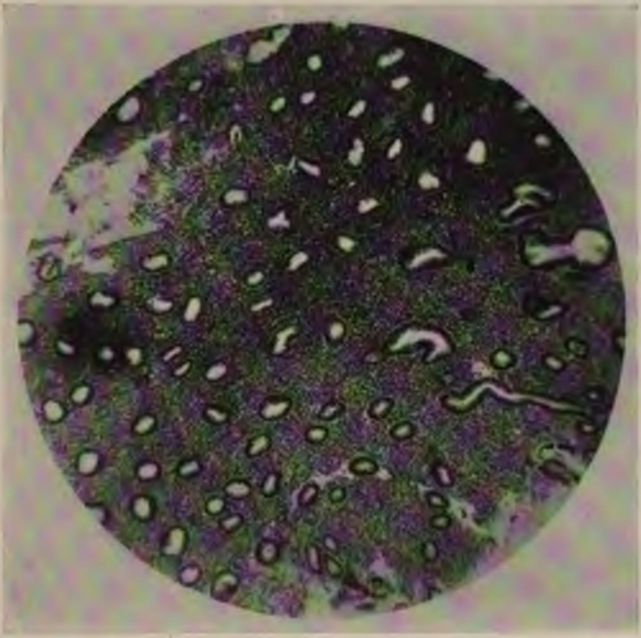


FIG. 36. — POST-MENSTRUAL ENDOMETRIUM. (Photomicrograph.) The glands of the endometrium are narrow and regular in outline. The stroma is dense.

lined with a single layer of the same variety of epithelium which is found on the surface.

The appearance of the endometrium varies greatly with the different periods of the menstrual cycle.

Just *after menstruation* the glands are collapsed, straight, and narrow. The surface epithelium and the epithelium of the glands is low, regular, in a single layer, and takes the tissue stain evenly and deeply. The stroma cells are regular in size, oval in shape, and stain well (Fig. 36).

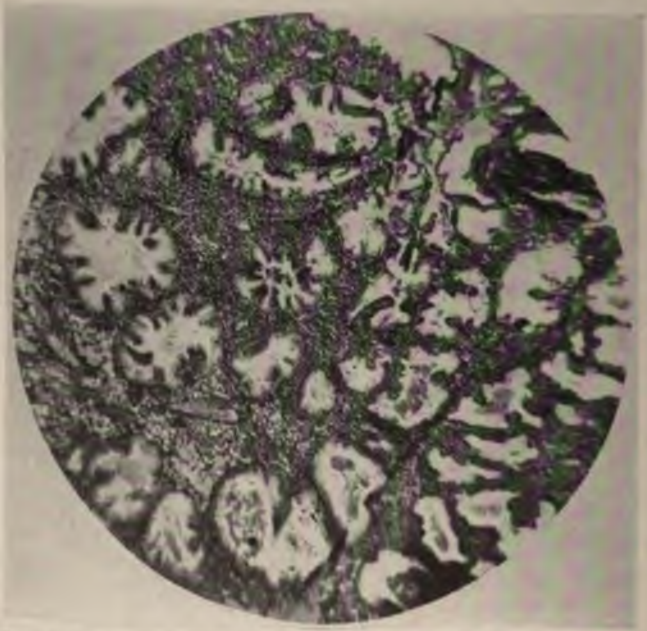


FIG. 37.—PRE-MENSTRUAL ENDOMETRIUM. (Photomicrograph.) The glands are widely distended and very irregular in outline. The stroma is much less dense than in the post-menstrual type.

Just *before menstruation* the glands are distended with mucus. They become so crooked that they are spoken of as corkscrew glands. The epithelial cells lining the glands are swollen and buckle out into the calibre of the glands.

This gives the appearance that is called saw-toothed glands. But with all these apparent irregularities there is preserved a certain amount of uniformity so that all the glands of the same endometrium have a similar appearance. The stroma cells are enlarged, more rounded, and take the stain less deeply. This change in the stroma cells is more marked in the superficial portion of the endometrium. There is some, though no very great, increase in the small round cells in the stroma (Fig. 37). In the interval between these two extremes there is a gradual change from post-menstrual type of endometrium to the pre-menstrual type. The direct cause of these changes in the endometrium and the menstrual flow is in all probability the ovarian secretion.

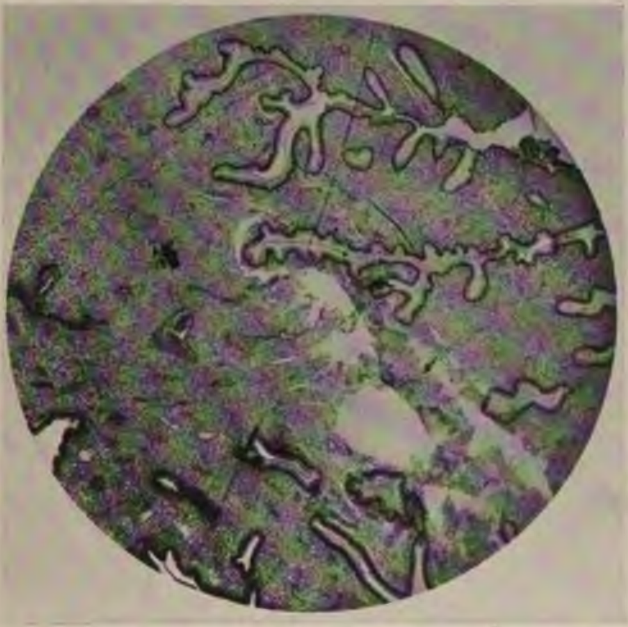


FIG. 38. — NORMAL CERVICAL GLANDS. (Photomicrograph.)

Cervix Uteri. — The cervix is cylindrical, a little wider in the middle than at the ends, and about one inch and a quarter long. The vaginal attachment divides the cervix into the vaginal and supravaginal portions. The cervix, like the body of the uterus, has a serous, a muscular, and a mucous coat. The serous coat is the reflection of the peritoneum which covers only the posterior wall of the supravaginal portion. The muscular layer consists of circular, longitudinal, and diagonal fibers. At the internal os the circular fibers greatly predominate, forming a sort of sphincter. At the external os there are also many circular fibers, but so definite a sphincter is not formed as at the internal os. The canal of the cervix is fusiform, being a little wider in the middle than at either end. Its upper end where it becomes continuous with the cavity of the uterus is known as the internal os. The outer end opening into the vagina is the external os. The cervical canal is lined by a mucous membrane which is thrown into numerous ridges (arbor vitæ) and penetrated by many branched glands (Fig. 38). It is covered with a single layer of high columnar epithelium whose nuclei are near the base of the cells. The glands are lined by a single layer of

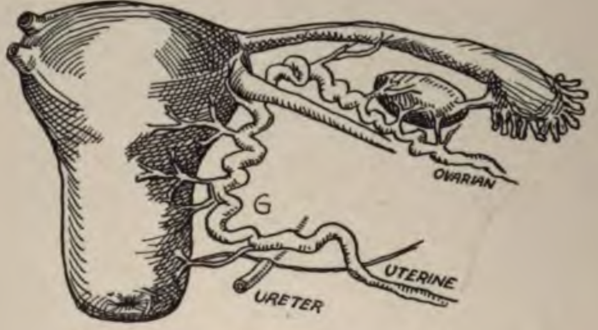


Fig. 39. — Blood Supply to the Uterus.

the same kind of epithelium. The outer surface of the vaginal portion of the cervix is covered by a mucous membrane that is a continuation of the mucous membrane of the vagina and whose surface epithelium is of the same stratified squamous type that is found in the vagina. Under normal conditions the squamous epithelium terminates at the external os; but it is a stronger growing epithelium than the high columnar of the cervical canal, and frequently if the columnar epithelium is destroyed either by direct violence or infection it is replaced by squamous epithelium. This accounts for the presence of the squamous epithelium sometimes found on the surface of the lower part of the cervical canal.

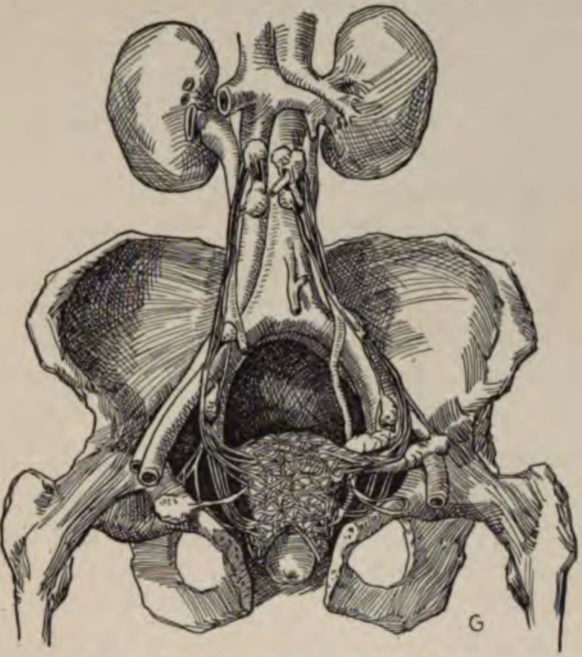


FIG. 40. — LYMPHATICS OF THE UTERUS.

Blood Supply. — The blood supply to the uterus is from two sources, — the two ovarian arteries and the two uterine arteries. The *ovarian arteries* come off from the abdominal aorta just below the renal arteries. They diverge somewhat from each other as they descend, and on reaching the level of the common iliac artery they turn inward between the folds of the broad ligament. Branches are given off to supply the Fallopian tubes and ovaries. When they approach the uterus they turn downward to anastomose with the uterine arteries. Many small branches are given off that supply the body of the uterus. The *uterine arteries* rise from the anterior branches of the internal iliacs. They pass downward and inward through the bases of the broad ligaments to near the cervix, and then upwards to anastomose with the ovarian arteries. They pass over the ureters about half an inch from the cervix. Neither the ovarian nor the uterine arteries penetrate the walls of the uterus.

Lymphatics. — The lymphatics from the upper part of the body of the uterus pass outward in the broad ligament following the general course of the ovarian vessels to the lumbar glands. The lymphatics from the lower part of the body and from the cervix run along the course of the uterine artery and terminate in the internal iliac glands. A few lymphatic vessels follow the round ligaments to the inguinal glands.

MALFORMATIONS OF THE UTERUS

The Fallopian tubes, the uterus, and the vagina are developed from the ducts of Müller. In early embryonic life these two ducts are entirely separated from each other, but during the process of development the lower portions approach each other and fuse together. The approximated walls are absorbed, and from this united portion the uterus and the vagina are formed; the remaining ununited portions of the ducts form the tubes. The malformations of the uterus and vagina are the result of a failure of the ducts of Müller either to unite, or the failure of the septum to be absorbed throughout a part or the whole of the normal segment of fusion. Where there is an entire failure of fusion and both ducts develop, the result is a double vagina and a double uterus each having one Fallopian tube. When the absorption of the partition extends as far as the external os, the result is a normal vagina and double uterus. When the septum is absorbed as high as the internal os, the result is a uterus bicornis. When only one lateral segment develops the other remaining rudimentary, the result is a uterus unicornis.

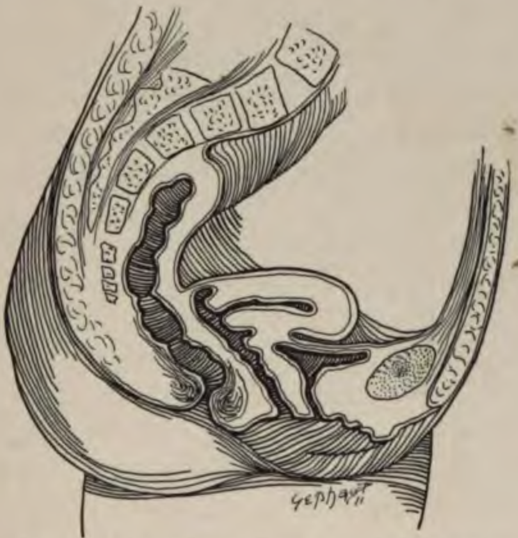


FIG. 41. — NORMAL POSITION OF THE UTERUS.

NORMAL POSITION OF THE UTERUS

When a woman is in the erect position with the bladder empty the uterus is curved slightly forward upon itself with its axis nearly horizontal. It has a wide range of normal m ility. The uterus is maintained in its position by the floor of the pelvis and by its ligaments. The *ligaments* are the two broad, two round, two utero-sacral, and two utero-vesical. The broad ligaments are formed from the two layers of the peritoneum that pass off from the anterior and posterior surfaces of the uterus to the sides of the pelvic wall. The lower portions are strengthened by a few muscular fibers and by considerable connective tissue. The upper parts have very little connective tissue. The round ligaments are two cords of muscular and connective tissue that leave the uterus just in front of the Fallopian tubes, take a peritoneal covering from the anterior layers of the broad ligaments, pass out through the inguinal canals, and are lost in the mons veneris and the labia majora. They diminish in size as they recede from the uterus. The utero-sacral ligaments are two folds of peritoneum that pass downwards from the uterus forming the lateral boundaries of Douglas' cul-de-sac, and are attached near the third sacral vertebra. They have some muscular and connective tissue in their lower borders. The utero-vesicle ligaments are two folds of peritoneum that pass forward from the uterus to the bladder.

[illegible]

CHAPTER IX

DISPLACEMENTS OF THE UTERUS

The uterus may be displaced forward, backward, downward, upward, laterally, or it may be inverted.

FORWARD DISPLACEMENTS

Displacements of the uterus forward are classed as anteversions and anteflexions.

ANTEVERSION

In anteversion the uterine axis is turned sharply forward; but when the uterus is freely movable and the bladder is empty, this is the normal position of the uterus. Even when there is an extrauterine inflammatory process, or a new growth that fixes the uterus definitely in this position, the position itself has no pathological significance. Therefore anteversion of the uterus as a pathological entity does not exist. It is the associated lesion which must be recognized and treated.

ANTEFLEXION

Anteflexion of the uterus is the sharp bending forward of the uterus on its own axis. The point of flexion is usually at or just below the internal os. Anteflexion is a congenital condition. The body is usually small and poorly developed and the cervix is long and narrow.

Symptoms. — Dysmenorrhea and sterility are the only marked symptoms that are associated with anteflexion. The pain during menstruation usually dates back to the first menstrual period. It is severe, intermittent, begins a few hours before the flow makes its appearance, and is usually much lessened after the first twenty-four hours. Many patients are confined to bed for the first day or two of each menstrual period. The intermenstrual period is free from pain. A very large proportion of married women who are sterile and who have had dysmenorrhea from the time they first began to menstruate, have anteflexion of the uterus.

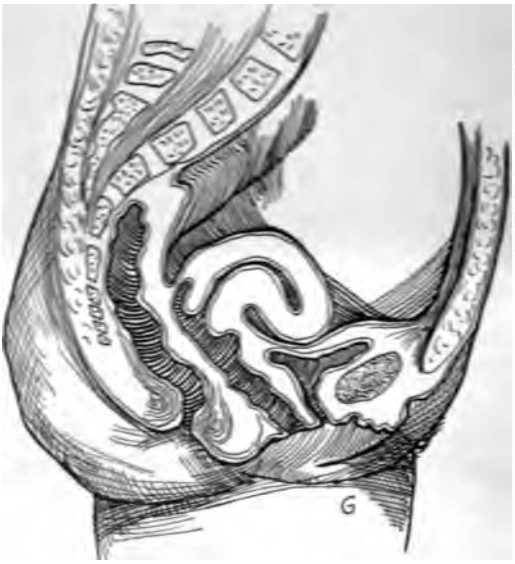


FIG. 42. — ANTEFLEXION OF THE UTERUS.

Diagnosis. — By bimanual examination the relation of the body of the uterus to the cervix can be made out easily and the vaginal finger can be introduced into the angle formed by the body and the cervix.

Treatment. — Anteflexion of the uterus being a congenital defect is not easily corrected. A number of operations have been devised for the relief of the condition. The wide dilatation of the cervical canal with efficient packing gives very satisfactory results. The dilatation must be done slowly and thoroughly. The canal should be stretched with a parallel-bar dilator to a diameter of about one inch and a quarter. The cervix may be torn if too much force is used or if dilated too rapidly. The cavity of the uterus is then curetted to clear out any mucus that may have accumulated and to relieve the associated endometritis if one be present. A hard roll of sterile gauze as large as can be pushed through the internal os is introduced and left in the uterus for forty-eight hours. After the gauze has been removed from the cervical canal a hot saline douche is given twice daily for a few days. The patient is rarely confined to the bed more than four days.

BACKWARD DISPLACEMENTS

Backward displacements of the uterus are classified as retroversions and retroflexions. When the uterus is *retroverted* the whole axis of the uterus is changed so that the fundus points towards the sacrum and the cervix towards the symphysis. When the uterus is *retroflexed* its axis is bent backward upon itself. The cervix may be in a nearly normal position. The body lies in Douglas' cul-de-sac. There are many variations in degree both in retroversions and retroflexions. Since the causes, symptoms, diagnosis, and treatment of both retroversions and retroflexions are practically the same, it is simpler to group both conditions together and speak of them as *retrodisplacements.*

Etiology. — About twenty-five per cent of all retrodisplacements of the uterus are congenital. Among the more common causes of acquired retrodisplacements are increased weight of the uterus in the puerperium; overdistention of the bladder, especially when aided by the obstetric binder; too long a retention of the recumbent position after labor; subinvolution; injuries to the pelvic floor; adhesions due to salpingitis; fibroids of the uterine wall; and cysts of the ovaries. It is a common belief that retrodisplacements frequently result from falls and strains, but retrodisplacements from these causes are certainly very rare, if they ever occur.

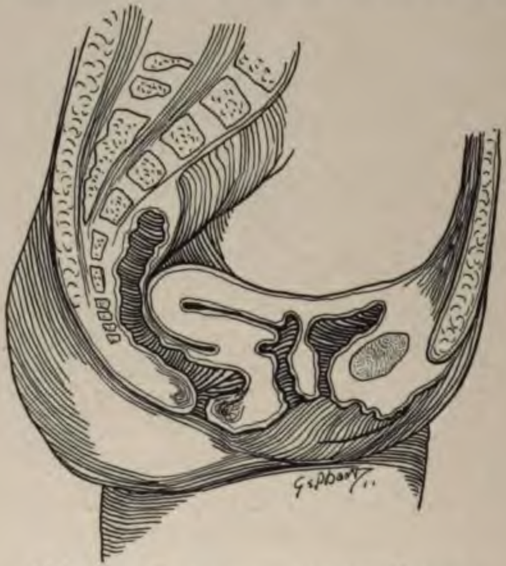


FIG. 43. — RETROVERSION OF THE UTERUS.

Pathology. — The lesions most frequently found associated with acquired retrodisplacements are metritis, passive congestion of the uterus, hypertrophy of the endometrium, ruptures of the pelvic floor, rectocele, cystocele, and relaxation of all the uterine ligaments.

Symptoms. — Some retrodisplacements give rise to no symptoms. Some of the congenital retroflexions produce symptoms very similar to those due to anteflexion. Many of the congenital and nearly all of the acquired retrodisplacements are the cause of one or more of the following symptoms: a sense of weight and pressure in the pelvis, backache, occipital headache, disturbances of digestion, constipation, frequent urination, dysmenorrhea, menorrhagia, leucorrhea, and nervous symptoms.

The pelvic discomfort and backache are constant and are increased when the patient is much on her feet. The occipital headache is usually associated with the menstrual period. It is often of great severity. Constipation results in the exceptional cases where the body of the uterus falls against the rectum and blocks it mechanically. Frequent urination is produced by the cervix pressing the base of the bladder against the pubis. The dysmenorrhea is not so marked as in anteflexion, but the pelvic pain and the pain

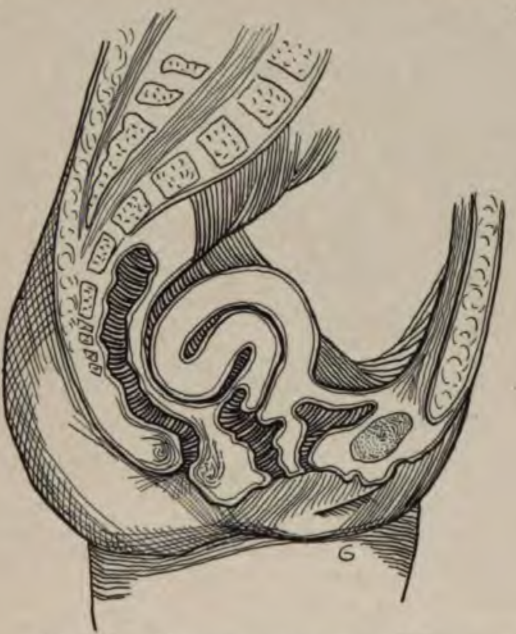


FIG. 44. — RETROFLEXION OF THE UTERUS.

in the back that are present in the intermenstrual period are increased in severity during the flow. The menstrual period is prolonged, sometimes increased in frequency, and the flow is more profuse than normal. Leucorrhea is due to the migration of small round cells and leucocytes from the congested endometrium. They escape through the epithelium of both the glands and the surface. The nervous symptoms are very variable. Not infrequently they are of such a character that they are mistaken for true hysteria. Some patients have no symptoms whatever except the disturbances of the nervous system.

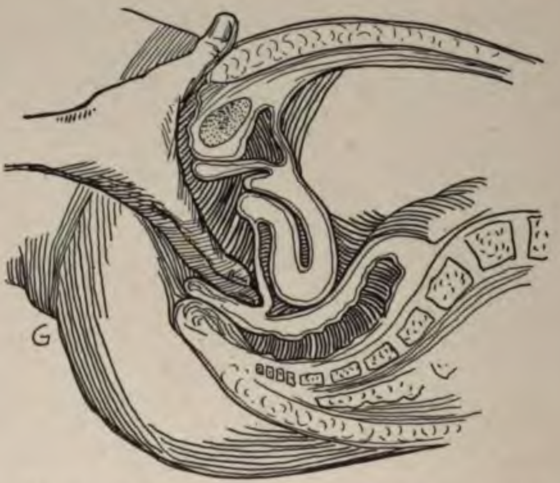


Fig. 45. — Manual Replacement of Retrodisplaced Uterus. First step. The body of the uterus is elevated by pushing it upward with the fingers introduced into the vagina.

Diagnosis. — On bimanual examination the body of the uterus is not found in its normal position. If a retroversion is present the cervix will be found pointing forward, while the fundus will be found near the sacrum. If a retroflexion is present, the cervix may point towards the pubis or it may be in its normal position. The body will be found behind the cervix. There are very few pelvic conditions that render the diagnosis of uncomplicated retrodisplacements difficult. Uterine fibroids, salpingitis, adherent enlarged ovaries in the cul-de-sac, and some other conditions sometimes make it very difficult to definitely locate the body of the uterus. With any of these lesions, whether there is a displacement of the uterus or not is a minor matter. The primary lesion calls for the first consideration.

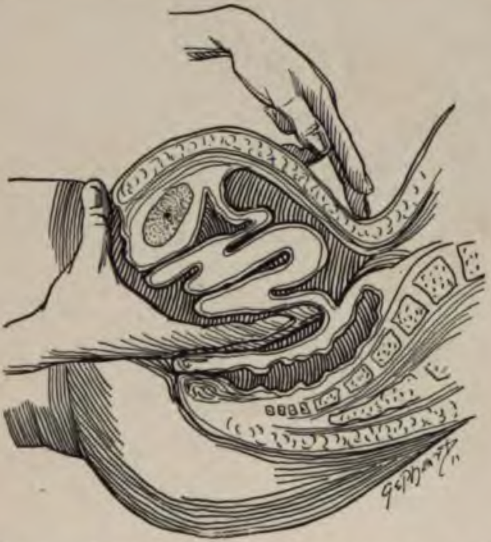
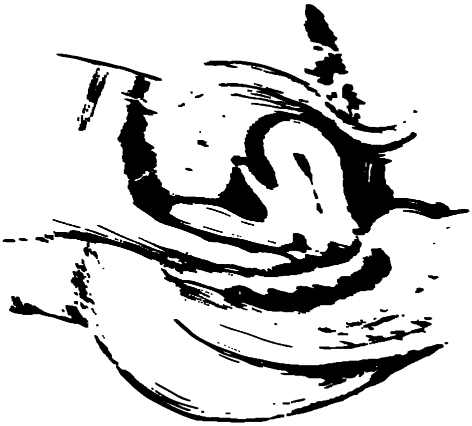


FIG. 46. — MANUAL REPLACEMENT OF RETRODISPLACED UTERUS. Second step. After the body of the uterus has been elevated by the fingers in the vagina, the fingers of the external hand are pushed down behind the fundus.

Treatment. — When the measures for the relief of retrodisplacements are considered it is necessary to divide the retrodisplacements into two classes, the adherent and the non-adherent. The adherent retrodisplaced uterus is one that is fixed in its position by adhesions which have resulted from a pelvic peritonitis. These cases can be successfully treated only by operation. A few of the non-adherent or movable retrodisplacements may be relieved by the use of [illegible] that gives the [illegible] are the acquired [illegible] soon after the dis- [illegible] may be added a [illegible] that are seen late [illegible]

[illegible] a retrodis- [illegible] the displacement



[illegible] Third step. [illegible] of the [illegible] of [illegible]

[illegible] reduced. [illegible] pelvic congestion by the use of [illegible] attempting to replace the uterus [illegible] saturated with glycerin, should be [illegible] every second day and allowed to remain [illegible] twenty-four hours. After the tampons are [illegible] inches of [illegible] salt solution should be used twice a day until the tampon is reinserted. The treatment should be continued until the pelvic pain and backache are relieved and the tenderness of the uterus has diminished to such an extent that the uterus can be manipulated without giving undue pain.

To replace the uterus, insert two fingers into the posterior vaginal fornix and push the body of the uterus as high as possible (Fig. 45), then bring the fingers in front of the cervix and force it back as far as can be done. At the same time the hand over the abdomen is forced down behind the fundus and it is pressed forward (Figs. 46 and 47). The uterus can usually be replaced in this way without any very great difficulty, but occasionally it may be necessary to give the patient an anesthetic to secure sufficient relaxation of the abdominal wall. Instruments especially devised for the replacement of the uterus are to be avoided because more harm than good is likely to be done by them.

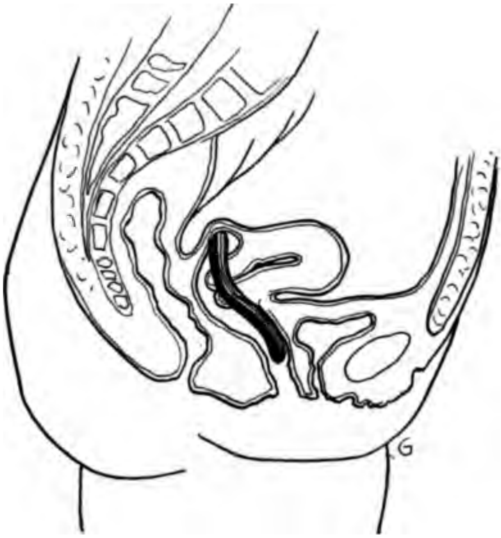


FIG. 48. — A PESSARY IN POSITION.

as to firmly close the opening made in the fascia by the insertion of the forceps.

The peritoneum and fascia of the rectus muscle are closed in the usual way. A separate fine running catgut suture is used to close the superficial fascia. This gives an additional protection to the sutured openings in the inguinal canal. The skin is closed with horse hair.

This operation is applicable to all cases, except the occasional ones where the round ligaments are so small that they are too weak to be of any practical use.

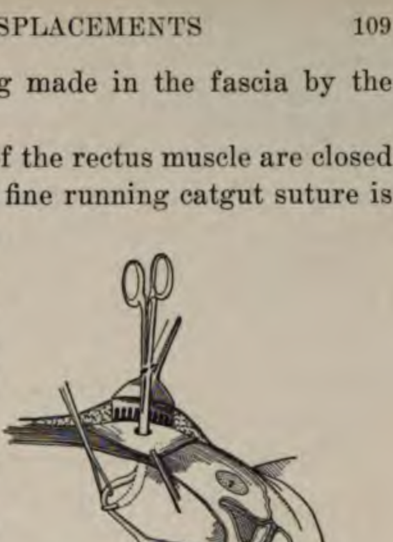


FIG. 49. — ROUND LIGAMENT SUSPENSION OF THE UTERUS. The curved forceps has been pushed down through the abdominal wall and between the layers of the broad ligament and is shown grasping the round ligament.

Gilliam Operation. — The Gilliam operation is in principle the same as that of the operation just described, the difference being that in the Gilliam operation two small openings are made directly through the recti muscles on either side of the abdominal incision and loops of the corresponding round ligaments are drawn up through them and stitched to the fascia.

Ventro-suspension. —The abdomen is opened in the median line just above the symphysis. The uterus is turned forward and the posterior median portion of the fundus is attached to the parietal peritoneum by two fine silk stitches (Fig. 50). The abdomen is closed in the usual way. Later the attachment to the parietal peritoneum

[illegible]

[illegible] Ventro-suspension. [illegible] has been brought up to the [illegible] and the sutures for attaching it to the peritoneum are in [illegible]

[illegible] women pregnant. Quite a number of instances of this kind have been recorded, and on this account the operation is not so generally used as it was a few years ago, but in the exceptional cases in which a round ligament suspension is not practicable, ventro-suspension is very useful.

Alexander's Operation. An incision is made parallel to and just above the inner half of Poupart's ligament. The round ligament is exposed in the lower part of, or as occurs in a nulliparous woman it is due either to the failure of development of the uterine supports, or to the pressure downward of some pelvic or abdominal tumor.

Pathology. — In complete prolapse the condition is really a hernia, the contents of which include all the pelvic structures and some intestines. This sac is made up of the everted vaginal wall near the middle of which is the uterus. In front the bladder comes down along with the anterior vaginal wall. Behind, the vaginal wall may be separated from the rectum, or the rectal wall may come down along with the vaginal wall. The uterus is usually sub-involuted; very commonly there are lacerations and hypertrophy of the cervix. Erosions due to the friction against the clothing are frequent. The broad and round ligaments are relaxed, and in long standing cases the ligaments may be atrophied.

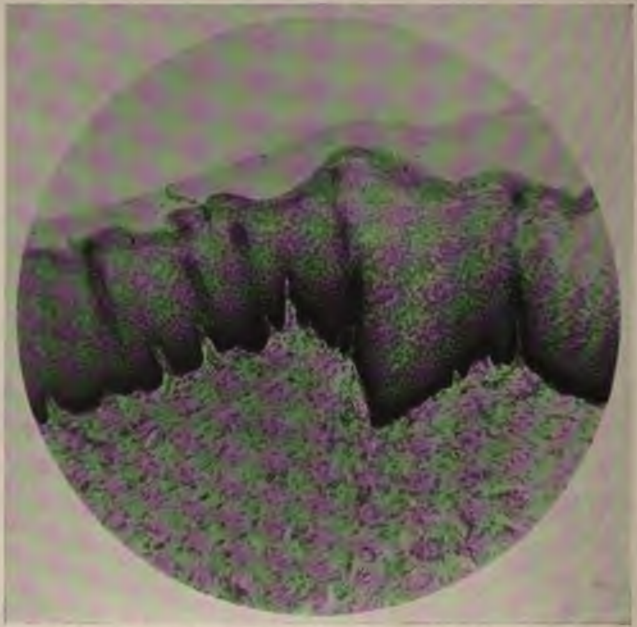


FIG. 52. — THICKENED EPITHELIUM ON A PROLAPSED CERVIX. (Photomicrograph.)

The vaginal walls being exposed to the air and to the friction of the clothing become dry. The vaginal epithelium becomes thickened and acquires a horny layer (Fig. 52). Ulcerated areas on the vaginal wall are comparatively common. In rare instances an epithelioma develops in the exposed mucous membrane of the vagina. The prolapsed bladder frequently becomes infected. More rarely there is a catarrh of the rectum, and in some instances hard fecal masses accumulate in the rectocele. All of these changes come on slowly. The gradual descent of the uterus in most instances extends over a number of years.

Symptoms. — Most of the symptoms of prolapse of the uterus are primarily due to the associated lesions. There is some pain in the back and a dragging sensation in the pelvis. This pain is more marked in the minor degrees of prolapse than in complete prolapse. Many patients with a complete prolapse have practically no symptoms except the discomfort due to the exposure of the cervix and the vaginal walls to the friction of the clothing. Menorrhagia is comparatively common. It is not so marked as in retrodisplacements. This same group of cases may have leucorrhea. Dysmenorrhea is rare. When a cystitis is present it causes frequent and painful urination, giving the patient more discomfort than any other one of the associated lesions. The majority of these patients suffer from constipation due to the lack of support of the rectal walls. When there is an erosion of the cervix or the vaginal mucous membrane, there may be slight hemorrhages from the rupture of small vessels in the eroded area.

Diagnosis. — The diagnosis can usually be made by inspection. By palpation the body of the uterus can be found between the protruding anterior and posterior vaginal walls. In the minor degrees of prolapse the cervix is felt very close to or at the vaginal outlet and the body correspondingly near. An hypertrophic elongation of the cervix may be mistaken for prolapse. On bimanual examination the body of the uterus will be felt near its normal position, and the lengthened cervix can be felt extending downward from the body to or through the vaginal outlet. A sound introduced into the uterine canal shows it to be much longer than normal. Cystocele and rectocele are both frequently confused with prolapse of the uterus by the laity. A cystocele presents a rounded mass projecting from the vaginal outlet and has numerous transverse ridges in the mucous membrane. It is easily pushed back; the examining finger passes under it. A rectocele presents a smooth rounded mass projecting from the vaginal outlet; the examining finger passes over it. The finger introduced into the rectum will enter the protruding mass. In both cystocele and rectocele the uterus can be felt above the protruding mass.

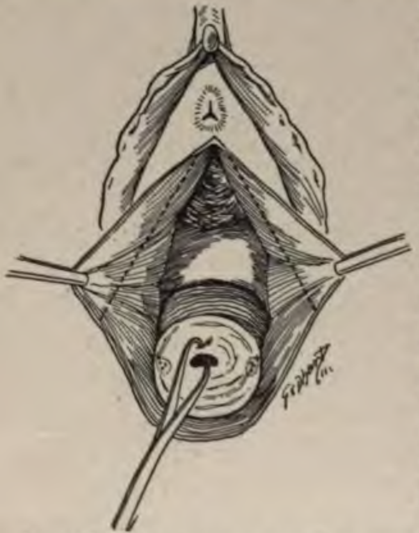


FIG. 53. — OPERATION FOR PROLAPSE OF THE UTERUS. First step. The cervix has been amputated by the method shown in Figs. 57, 58, and 59. The bladder has been separated from the anterior vaginal wall and from the uterus as is shown in Fig. 27. The dotted lines indicate the excess anterior vaginal wall to be removed.

Treatment. — There are relatively few cases of prolapse of the uterus that can be treated satisfactorily with pessaries. In some of the minor degrees of prolapse, if the patient is seen before the prolapse has been present too long the wearing of a pessary may keep the uterus in its normal position until involution in the uterus and in the ligaments takes place, after which the pessary may be dispensed with. In patients who are advanced in years, or who on account of some other reason are not good subjects for operation, a plain hard-rubber ring pessary can be used. Pessaries cannot be used satisfactorily in any case unless there is a fairly good pelvic floor. Numerous operations have been devised for the relief of prolapse. In the minor degrees of prolapse all that is necessary usually is to repair the injuries to the pelvic floor. At the time this repair is made the uterus should be curetted and any lacerations of the cervix repaired. The repair of the cervix and the curettement promote the involution of the uterus which has been one of the causes of the prolapse.

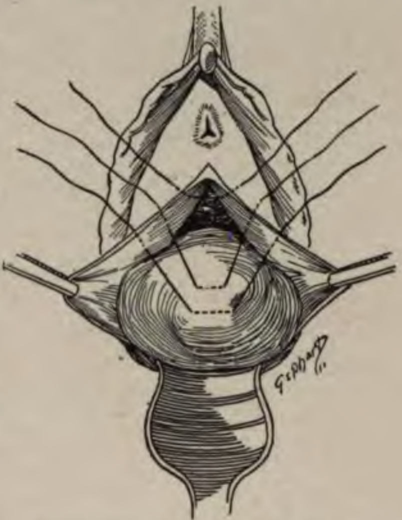


FIG. 54. — OPERATION FOR PROLAPSE OF THE UTERUS. Second step. Sutures to attach the fundus of the uterus to the anterior vaginal wall are shown in position.

The OPERATIVE PROCEDURES for the restoration of a completely prolapsed uterus include curettement, amputation of the cervix, fixation of the body of the uterus forward, and repair of the perineum. The first step in the operation is the dilatation and curettement of the uterus. A circular incision is then made around the cervix through the mucous membrane and a cuff of the vaginal mucous membrane is dissected back from the cervix. The cervix is amputated at a point as high as is desired. A strong catgut ligature is passed through each side of the cervical stump and tied tightly to prevent any hemorrhage from the lateral cervical vessels (Figs. 57, 58, 59, 60). A perpendicular incision is then carried up in the median line of the anterior vaginal wall from the circular incision nearly to the meatus. With a piece of gauze over the forefinger the bladder is dissected away from the uterus and away from the anterior vaginal wall (Fig. 53). The peritoneum is opened just in front of the uterus. The fundus of the uterus is brought out through this opening. The superfluous anterior vaginal wall is cut away on either side of the perpendicular incision. If the patient has not arrived at the menopause the tubes should either be removed or resected. The fundus of the uterus is then stitched to the anterior vaginal wall just beneath the bladder (Fig. 54). The remainder of the incision in the anterior vaginal wall is closed. The vaginal flap around the cervix is stitched to the cervical endometrium to preserve the cervical canal. The perineum is then repaired by any method of choice.

LATERAL DISPLACEMENTS

The uterus may be displaced laterally when there is an extreme relaxation of the broad ligaments with a loss of tone in the muscular wall of the uterus. When these conditions are present a retroflexion of the uterus usually occurs; but the fundus may be turned to either side. The diagnosis and treatment for this form of lateral deviation would be the same as for a retrodisplacement with similar associated pathological lesions. The uterus may be pushed to one side or the other in the pelvis by tumors, or it may be dragged to one side by cicatrices in the broad ligament. Bad tears received during labor starting in the cervix and extending out into the lateral vaginal wall may leave a cicatrix which will draw the cervix firmly over to the injured side. When the lateral displacement is due either to tumors or cicatrices the treatment is to be directed towards relieving the cause of the displacement.

UPWARD DISPLACEMENTS

Upward displacement of the uterus may be due to tumors in the pelvis pushing the uterus up, or in exceptional cases due to the contraction of adhesions drawing the uterus higher than its normal level.

INVERSION OF THE UTERUS

Inversion of the uterus is a turning of the uterus inside out. The inversion is usually not complete. The body of the uterus comes down through the cervix and projects as a rounded tumor through the external os into the vagina.

Etiology. — This condition is nearly always brought about by an unusual degree of relaxation of the uterus after the second stage of labor is completed. It may be caused directly by strong traction on the cord when the uterus is relaxed in efforts to deliver the placenta, or the fundus may be pushed down through the internal os by too strong pressure over the abdomen during the period of relaxation. Submucous fibroids that have their origin near the fundus of the uterus may drag the fundus down and cause inversion.

Symptoms. — The earlier symptoms are hemorrhage and pain. The hemorrhage in some of these cases is very severe and may cause a fatal termination. Pain is due to the contraction of the uninverted portion. In the cases of longer standing the hemorrhage becomes less, but there is usually in all cases a menorrhagia. The pain gradually decreases and the patient's discomforts are produced mainly by the tumor in the vagina.

Diagnosis. — The history indicates that the trouble began immediately after the last labor. On vaginal examination a rounded mass is felt in the vagina, the highest portion of which is surrounded by a definite ring. This ring is the dilated external os. On bimanual examination the body of the uterus is found to be absent from its normal position. In some instances when the abdominal walls are thin, a cup-shaped depression can be made out in the upper pole of the pelvic tumor. This depression is the concavity left by the disappearance of the body through the cervical canal. On inspection the openings of the Fallopian tubes at the lateral angles at the base of the tumor may be found. On attempting to introduce a sound through the external os, it will be found to pass only a short distance, but the depth to which it can be passed is the same on all sides of the tumor. A fibroid polypus projecting through the external os resembles very closely an inverted uterus. The symptoms produced by it do not date from a labor. On bimanual examination the body of the uterus can be felt above the projecting tumor. On inspection the openings of the Fallopian tubes are seen to be absent. A sound inserted through the external os goes up the full depth of the uterus.

Prophylaxis. — Since inversion of the uterus in most instances is caused by misdirected efforts in the extraction of the placenta, the traction on the cord and pressure over the fundus of the uterus in the interval between uterine contractions should be avoided.

Treatment. — In the acute cases the uterus can usually be returned to its proper position by making direct pressure upon the inverted fundus with the fingers or with the fist. After the uterus is restored to its normal position the cavity should be packed with sterile gauze until firm uterine contractions take place.

In the long standing cases the most satisfactory method is to split the binding ring of the cervix either anteriorly or posteriorly, or both. Then push the fundus of the uterus upwards to its normal position. Close the incisions and pack the uterine cavity with sterile gauze. In exceptional cases where there are many adhesions due to a former infection, it may be necessary to do a vaginal hysterectomy.

CHAPTER X

DISEASES OF THE CERVIX

LACERATION OF THE CERVIX

Some laceration of the cervix occurs in nearly all labors. The great majority of these lacerations are of a minor degree and are of little or no pathological importance. They heal spontaneously and give rise to no symptoms and require no treatment.

Etiology. — The direct causes of the more severe tears are the application of the obstetric forceps before the cervix is sufficiently dilated, forcible manual or instrumental dilatation of the cervix, premature rupture of the membranes, and excessive uterine contractions. The rapid deliveries done for placenta previa and eclampsia are fruitful sources of lacerations of the cervix.

Pathology. — Bilateral tears of the cervix are the most common. As a rule the deeper tears are on the left side. In women who have borne many children and more rarely in those who have had only one child, stellate tears are found. A tear may extend out into the vagina and a contracting scar resulting from a vaginal tear may drag the cervix towards the lateral pelvic wall and limit its mobility.

The cases of laceration of the cervix of long standing that are of *clinical importance* have associated with them either subinvolution of the uterus; infection of the cervical endometrium; erosions, eversion, or cystic degeneration of the cervix; or masses of scar tissue in the line of attempted union. Any one or all of these lesions may be present. The masses of hard cicatricial tissue which are the result of nature's attempt to repair the injury have been considered the most important of these lesions, but their significance has probably been overestimated.

Symptoms. — At the time the laceration occurs, there is sometimes a severe hemorrhage from it. This hemorrhage can usually be distinguished from an ordinary post-partum hemorrhage due to relaxation of the uterus, by the fact that it continues after the uterus is firmly contracted and consists of a small continuous stream of blood.

In cases of long standing the symptoms are due to the associated lesions rather than to the laceration itself. Subinvolution causes backache and a sense of dragging and weight in the pelvis. The infection of the cervical endometrium and cicatrices give rise to pains in the left iliac region. The cervical disease constantly irritating the general nervous system causes reflex pains in the various parts of the body and sometimes symptoms of hysteria. The infection of the cervical endometrium and erosion of the cervix cause leucorrhea. Sterility is not uncommon, and when there are deep lacerations in the cervix repeated abortions sometimes occur. So long as the lesions present do not involve the body of the uterus there is neither dysmenorrhea nor menorrhagia.

Diagnosis. — Diagnosis is readily made by vaginal touch. The absence of the smooth rounded vaginal portion of the cervix with its nearly circular opening is noted. In the bilateral lacerations the finger readily recognizes the cleft in the cervix and the widely separated lips. When there is much eversion the end of the cervix instead of being rounded presents an oval flattened surface, the long diameter of which runs antero-posteriorly. An eroded area has a soft velvety feel. In cystic degeneration nodular masses can usually be felt on the surface.

Treatment. — The hemorrhage occurring from laceration of the cervix immediately after labor is best controlled by exposing the cervix and bringing the tear together with a few deep sutures. The results secured from these immediate repairs of the cervix are excellent.

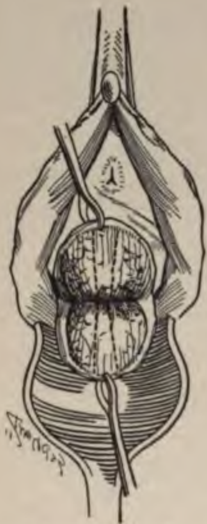


FIG. 55. — LACERATION OF THE CERVIX. The strips of mucous membrane between the dotted lines on the anterior and posterior lips must be left in repairing the cervix to preserve the continuity of the cervical canal.

In the cases of long standing the local conditions can be improved and the symptoms temporarily relieved by puncturing the Nabothian follicles and painting the erosions with Churchill's tincture of iodine. Glycerin tampons and hot vaginal douches are useful. The iodine applications should be made and the glycerin tampons should be introduced into the vagina two or three times a week. A vaginal douche may be used twice daily after the tampon has been removed. The relief which the patient gets from this treatment very soon disappears when the treatment is discontinued. Its principal value therefore is as a preparatory measure before operation.

The ordinary *bilateral tear* in the cervix is repaired as follows: The patient is put in the lithotomy position. A speculum is introduced to retract the perineum and expose the cervix. Both the anterior and posterior lips are seized by bullet forceps and the cervix drawn downward. The cervix is dilated, curetted, and wiped out with sterile gauze. The edges of the tear may be denuded either with a knife or with scissors. A strip of endometrium about a quarter of an inch wide must be preserved both on the anterior and posterior lips to line the cervical canal through the repaired portion of the cervix. This strip should be slightly wider at its outer end than it is above (Fig. 55). Any nodules of cicatricial tissue that remain after the first denudation can be felt by the finger and must be completely

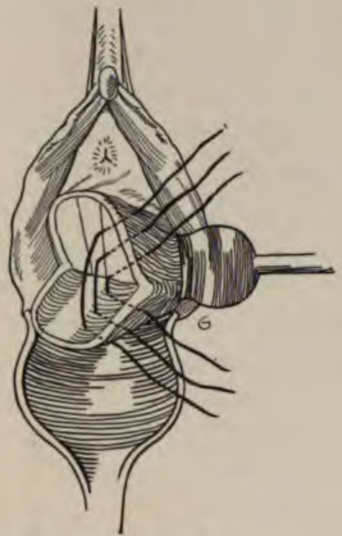


FIG. 56. — REPAIR OF LACERATION OF THE CERVIX. The angles in the cervical wound have been denuded and the sutures of one side are in position.

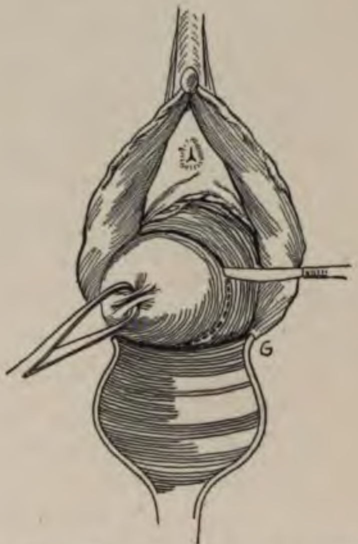


FIG. 57. — AMPUTATION OF THE CERVIX. First step. Shows the method of making a circular incision around the cervix.

removed. The stitches should be introduced from above downward. The highest stitch on each side should be tied rather tightly to control bleeding. Usually three stitches on each side are enough to bring the parts evenly together (Fig. 56). A great variety of suture material is used by different operators; silkworm-gut, silk, celluloid, and chromosized catgut. If a perineal repair is done at the same time catgut should be used in the cervix. Non-absorbable sutures should remain about ten days, though no harm is done if they are left considerably longer.

Where there have been numerous tears and the formation of much cicatricial tissue, it may not be practical to repair the cervix as described above. These cases are best treated by *amputation* of the cervix. In doing an amputation the preliminary steps are the same as for a cervical repair. When the curettement is finished the cervix is split on each side as far as the cicatricial tissue extends. The anterior and posterior lips are then amputated by wedge-shaped incisions. This removes the scar tissue but leaves the mucous membrane of the cervical canal and the mucous membrane on the outer side of the cervix. The flaps are brought together forming a new external os. The sides of the incision are closed by one or two stitches.

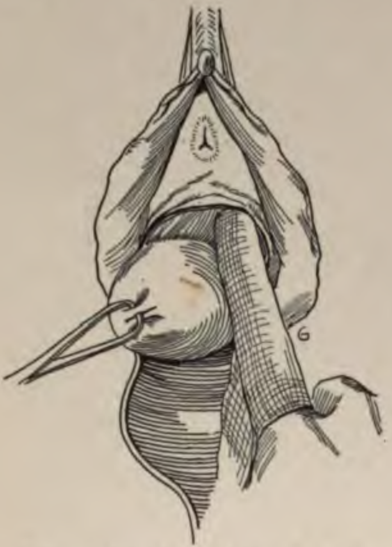


FIG. 58. — AMPUTATION OF THE CERVIX. Second step. Shows the method of separating the vaginal wall from the cervix.

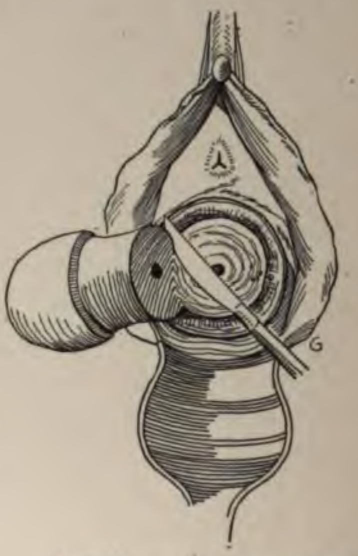


FIG. 59. — AMPUTATION OF THE CERVIX. Third step.

Another method of amputation that gives very good results, and is applicable to many other conditions, is performed as follows: Make a circular incision through the mucous membrane around the cervix (Fig. 57); dissect back a cuff of the vaginal wall to a point on the cervix just above the scar tissue (Fig. 58); amputate the cervix by a transverse incision (Fig. 59); tie off the arteries on both sides of the cervix, including some of the cervical tissue in the ligature; stitch the anterior median portion of the vaginal cuff to the cervical endometrium with two or three stitches; stitch the posterior median portion of the vaginal cuff to the endometrium in the same way. The remainder of the wound in the vaginal wall is closed over the end of the cervical stump (Fig. 60).

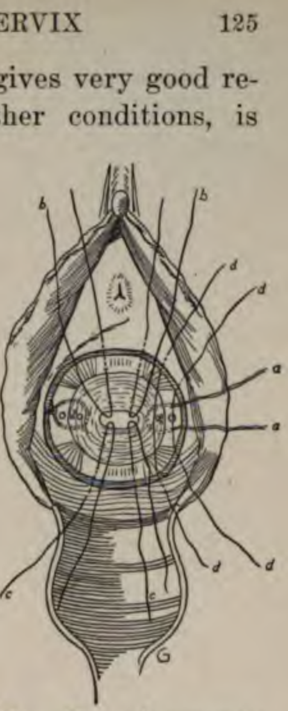


FIG. 60. — AMPUTATION OF THE CERVIX. Fourth step. Suture *a* is placed and tied tightly to control the hemorrhage from a small vessel that runs just external to the cervix and several small vessels within the cervical wall. Sutures *b*, *b* attach the flap of the anterior vaginal wall to the endometrium. Sutures *c*, *c* attach the flap of the posterior vaginal wall to the endometrium. Sutures *d*, *d* close the remaining gap in the vaginal wall on one side.

AFTER-TREATMENT. — Unless there are some special conditions demanding it, there is no occasion for the patient to remain in bed after operation more than a few days. After a week has elapsed a vaginal douche of normal salt solution or a very weak solution of bichloride of mercury can be used once daily, but the essential part of the after-treatment is not to interfere with the local healing by the use of meddlesome douches and applications.

ENDOCERVICITIS

(*Cervical Endometritis*)

Endocervicitis is an inflammation of the mucous membrane lining the cervical canal. Both acute and chronic inflammations of the cervical mucous membrane occur. The acute form is always so overshadowed by the associated infections of neighboring tissues that there is no occasion to consider it as a clinical entity. Chronic endocervicitis as a distinct disease is met with frequently.

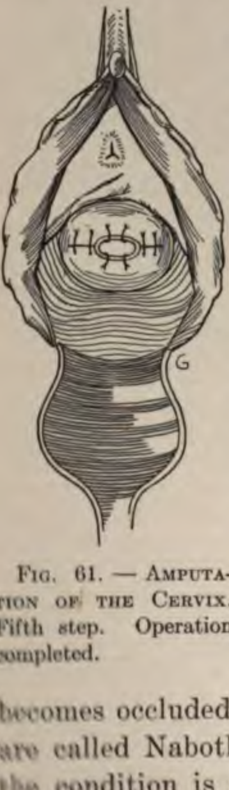


FIG. 61. — AMPUTATION OF THE CERVIX. Fifth step. Operation completed.

Etiology. — Laceration of the cervix favors the chances of infection. Many of the cases are due to infection by gonococci. A large proportion of cases are classified as catarrhal because it is difficult or impossible to isolate the micro-organism causing them.

Pathology. — The glands becoming infected throw off a profuse thick, tenacious secretion that blocks up the cervical canal. If the duct of a gland becomes occluded, a small retention cyst is formed. These are called Nabothian follicles. When they are numerous the condition is spoken of as cystic degeneration of the cervix. The contents of these cysts is clear, thick, and tenacious. On microscopical examination the glands are seen to be dilated and filled with mucus and lined by a single layer of epithelium. If the outlet of the gland has become occluded, the epithelial lining of the gland is thinned out from the pressure of the accumulated fluid.

EROSION OF THE CERVIX

As a result of maceration in the discharges from an endocervicitis there is frequently a loss of a part of the columnar epithelium in the lower portion of the cervical canal and a portion of the squamous epithelium just outside the external os. This area on the vaginal portion of the cervix may vary in size from a small ring surrounding the external os to the size of the end of the cervix. On inspection it presents a bright red color. On vaginal examination it feels to the examining finger like a piece of velvet. On microscopical examination an area can be seen where there is no epithelium (Fig. 63). When the process of recovery is partial it will be seen that the squamous epithelium has a tendency not only to cover over the area from which it has temporarily disappeared, but also to replace the eroded columnar epithelium. As a result of this, areas can be seen, the surface of which is covered with stratified squamous epithelium and in the deeper parts are the remains of cervical glands, the ducts of which have been destroyed in the process of erosion, and the space closed over in the process of healing. These closed-over glands fill up slowly with their own secretion, and form the little cysts frequently seen about the external os and known as the *Nabothian follicles*. Sometimes the covering to these closed glands is very thin, and, as the gland fills up, it projects in the form of a little polypus just at or within the external os. These are the so-called *mucous polypi*. The mucous

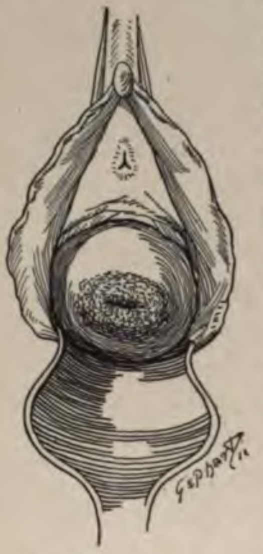


FIG. 62. — EROSION OF THE CERVIX.

inflammatory process the superficial portion of the glands is destroyed. In the healing process after the infection has subsided, new tissue forms over the remains of the partially destroyed glands. The epithelium remaining behind continues to secrete, but as there is no outlet, a small cyst is formed. In some instances these cysts will be so numerous that a section through them looks like a section through a honeycomb. Numerous small cysts of this character may be mistaken on macroscopical examination for latent adeno-carcinoma. On microscopical examination the cystic condition is easily recognized. The glands are lined by a single layer of columnar epithelium which, on account of the pressure to which it has been subjected, is usually lower than normal. In very rare instances a similar process causes the formation of mucous polypi high up in the cervical canal.

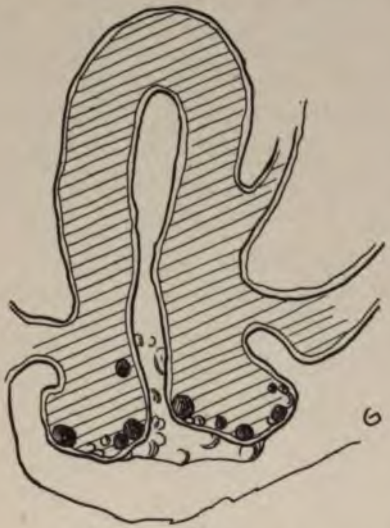


FIG. 64. — CYSTIC DEGENERATION OF THE CERVIX.

STENOSIS OF THE CERVIX

Stenosis of the cervix is a narrowing of some portion of the cervical canal. The narrowest points are usually either at the external or internal os. The condition may be a congenital one, or it may result from cicatrices following injuries received during labor or that are the result of operations on the cervix.

Symptoms. — Dysmenorrhea is the most marked symptom. It is most severe the first day of the period. The pain is intermittent. After the first twenty-four hours it usually decreases. Sterility is also very common, but is probably due more frequently to an associated endocervicitis than to the stenosis.

Diagnosis. — When the stenosis is at the external os it can be recognized by digital examination and by inspection. When the stenosis is higher in the cervical canal it can be recognized by the uterine sound. In the congenital cases the uterus is usually very small. In the acquired cases the stenosis will be found at the external os.

Treatment. — In some of the acquired cases it may be necessary to amputate the cervix to remove the cicatrix. In all other cases very good results are obtained by dilating and packing the cervix as is recommended in anteflexion of the uterus.

ATRESIA OF THE CERVIX

Atresia of the cervix is a complete closure of the cervical canal. It may be congenital or acquired. Acquired atresia may be due to the contraction of cicatrices after injury to the cervix received during labor, cauterization of the cervix, amputation, or attempts at repair of lacerations of the cervix. Adenocarcinoma of the cervix may completely close the canal; but this result rarely follows other cervical growths. If the atresia is congenital or occurs before the menopause, the uterus will fill up with blood and mucus. After the menopause the uterus becomes distended with mucus. In either case the contents may become infected, resulting in a pyometria.

Diagnosis. — By vaginal examination the cervix will be found to be closed. This closure is usually at the external os and can readily be felt and seen. On bimanual examination the body of the uterus is found enlarged, cystic, and usually tender on pressure.

Treatment. — An opening is made into the cervix either by amputating the lower part of the cervix or by making a deep antero-posterior incision and a transverse incision. After the contents of the uterus are evacuated, the cervical canal must be kept open by an intrauterine stem or by a gauze pack.

HYPERTROPHY OF THE CERVIX

Hypertrophy of the cervix occurs in two forms, — the general enlargement of the cervix which is associated with subinvolution of the uterus, and hypertrophic elongation of the cervix either above or below the vaginal attachment.

Elongation of the Vaginal Portion. — In this condition the cervix projects low into the vagina and sometimes entirely through the vaginal outlet. It is very commonly mistaken for prolapse of the uterus. It can be readily recognized by bimanual examination. The long narrow cervix can be felt in the vagina, while the body of the uterus is found in its normal position. This form of cervical hypertrophy is usually congenital.

Elongation of the Supravaginal Portion. This is the form that is sometimes found associated with prolapse of the uterus. On bimanual examination the cervix above the vaginal attachment is found to be very much longer than normal, while the whole uterus is displaced downward.

Treatment. — In the cases associated with subinvolution and in the cases of hypertrophic elongation of the vaginal portion of the cervix, an amputation may be done as described under amputation of the cervix for the removal of cicatricial tissue due to lacerations. In the cases where the hypertrophy is associated with prolapse of the uterus a cervical amputation is done as a part of the operation for the relief of the prolapse.

CHAPTER XI

DISEASES OF THE ENDOMETRIUM

ENDOMETRITIS

Endometritis is an inflammation of the mucous membrane lining the body of the uterus.

Etiology. — The direct cause of endometritis is an invasion of the endometrium by pathogenic micro-organisms. The micro-organisms most frequently causing it are the gonococcus, streptococcus, colon bacillus, and bacillus tuberculosis, but it may be due to some of the other pus-producing bacteria. Anything that interferes with the nutrition of the uterine mucosa may act as an indirect cause by favoring the possibilities of infection. Among these indirect causes are all the systematic diseases that impoverish the blood, uterine displacements, uterine fibroids, and pelvic growths that interfere with the return flow of blood from the uterus.

Pathology. — In the majority of cases an endometritis is associated with salpingitis, because in most instances any infection that passes the internal os continues to spread by continuity to the tubes. Before attempting to understand the changes taking place in the endometrium that are due to an infection, it is necessary for one to be familiar with the changes that take place in the endometrium associated with the menstrual cycle. These are described on page 92.

The changes due to an infection include the changes in the superficial epithelium and the epithelium lining the glands, the contents of the glands, the stroma cells, and the small round cells. One of the first changes that is noted is the tremendous increase in the number of small round cells. These can be seen scattered thickly throughout the stroma in the infected area. They penetrate between the cells of the superficial epithelium and escape into the cavity of the uterus. They pass through the glandular epithelium into the lumen of the glands. The superficial epithelium changes its shape, becomes rounded, and in some areas is completely destroyed. The same process takes place in the epithelium lining the glands. The destruction of the epithelium lining a gland or any portion of it means the permanent destruction of that portion of the gland in which the epithelium is destroyed. These changes in

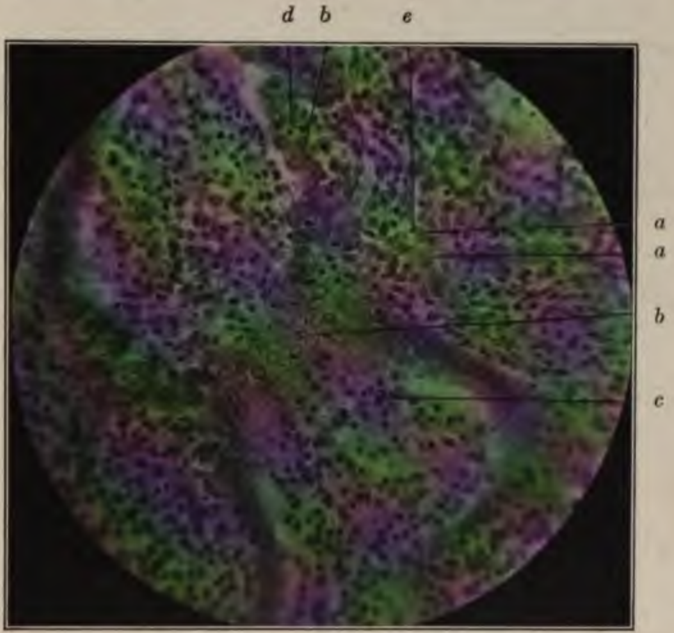


FIG. 65. — ENDOMETRITIS. (Photomicrograph.) The endometrium during the active stages of an infection; *a*, *a* are enlarged stroma cells; *b*, *b*, modified epithelial cells; *c*, round cells and leucocytes within the calibre of the gland; *d*, small round cell between the epithelial cells; *e*, small round cells in the stroma.

blasts. In the active stages of infection many of the glands are filled with small round cells, leucocytes, broken-down epithelium, and mucus. After the inflammatory process has passed by, it leaves permanent changes in the endometrium. The superficial epithelium is apparently always restored; but the partially and completely destroyed glands are never restored. The stroma cells that have been converted into spindle and fibroblastic cells never recover (Fig. 67).

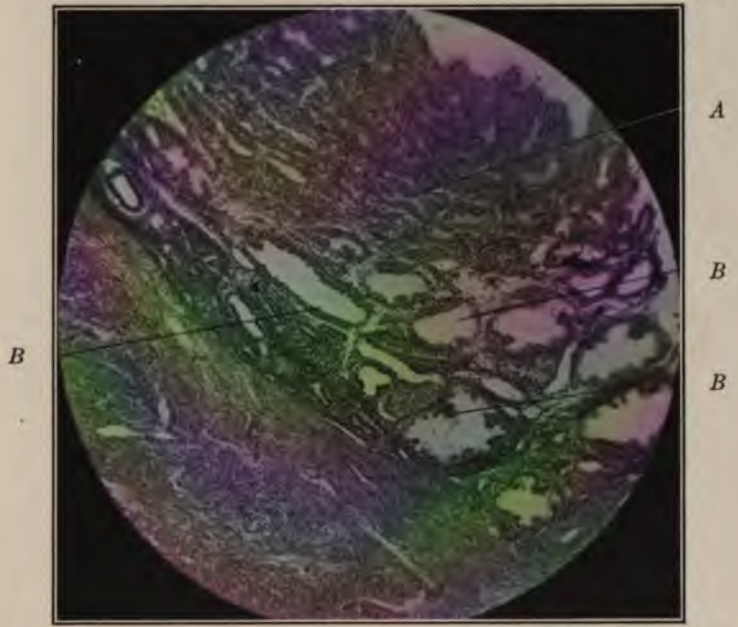


FIG. 67. — ENDOMETRITIS. (Photomicrograph.) An endometrium that has been infected is shown. The superficial part of the endometrium contains glands that are narrow and very irregular in outline. The deeper part of the endometrium shows glands that are very much dilated. Under higher magnification the stroma is shown to be made up of spindle cells and fibroblasts. *A*, narrow irregular glands; *B*, dilated glands.

Symptoms. — Since endometritis is so commonly associated with metritis and salpingitis, the symptoms due to it are blended with the symptoms due to the associated pathological lesions. Menorrhagia and leucorrhea are the two most distinctive symptoms. The uterine discharge is usually white, thin, and milky in appearance, but it is sometimes distinctly purulent. It is usually increased in quantity just before and just after the menses. There may be some sense of weight and dragging in the pelvis and some backache.

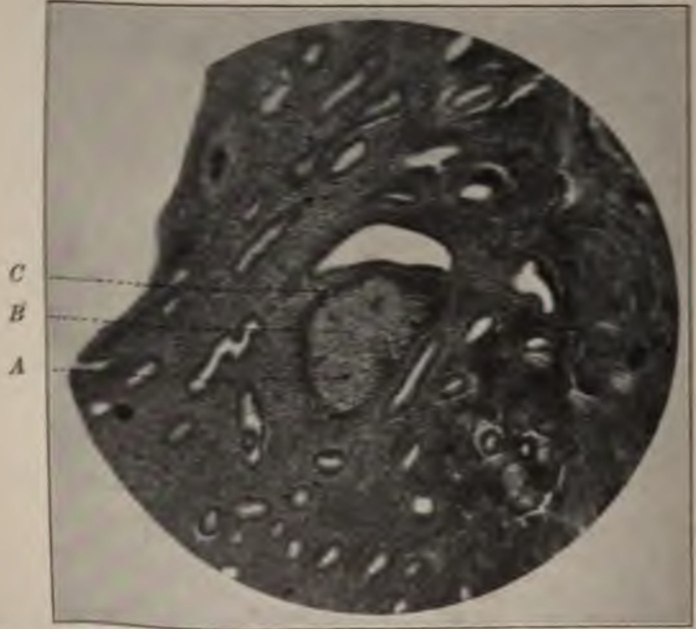


FIG. 68. — TUBERCULOUS ENDOMETRITIS. (Photomicrograph.) The position of three closely grouped giant cells is shown surrounded by a caseous area. Just beyond the caseous area is an intense round-cell infiltration. *A*, giant cell; *B*, caseous area; *C*, area of round-cell infiltration.

Diagnosis. — On bimanual examination in the absence of salpingitis, the uterus is found to be freely movable, slightly enlarged, and somewhat tender on pressure. The only method of making a positive diagnosis is by microscopical examination of scrapings.

Treatment. — In recently infected cases the treatment should be limited to the use of glycerin tampons or other means for the promotion of drainage. All intrauterine applications are positively contraindicated. In long standing cases the uterus may be dilated and thoroughly scraped out with a sharp curette.

TUBERCULOUS ENDOMETRITIS

Tuberculous infection of the endometrium is usually associated with tuberculous infection of the tubes.

Symptoms. — The symptoms of tuberculous endometritis are practically the same as those of other forms of infection of the endometrium. There is a leucorrheal discharge and usually a menorrhagia, though in cases of advanced general tuberculosis there may be amenorrhea.

Diagnosis. — The diagnosis can be made by the examination of the scrapings. Definite giant cells can usually be distinguished. There are numerous small caseous areas surrounded by marked small round-cell infiltration (Fig. 68). These caseous areas without the giant cells are quite sufficient for a diagnosis because they do not occur in any other form of endometritis.

Treatment. — Cases have been cured by thorough curettement, but the conservative measure is to remove the uterus and tubes.

HYPERTROPHIC ENDOMETRIUM

This condition is met with in patients of all ages, but is most frequently seen about the time of the menopause. It has been confused with endometritis. In this condition the mucosa remains permanently in a state very similar to the pre-menstrual endometrium, except that in the hypertrophic endometrium there is usually an actual increase in the number of glands. The glands are increased in size and filled with mucus. The epithelium lining the glands retains its normal relation to the interstitial tissue and to itself; that is, a single layer of epithelium lines the glands and there is no piling up of epithelium in the gland and no tendency for it to break through into the stroma.

Symptoms. — The only symptom of importance is the hemorrhage, which may be only a menorrhagia or may be a persistent metrorrhagia. In either case the flow may be very profuse, but is more frequently a persistent rather than a free flow.

Diagnosis. — The diagnosis is made by a microscopical examination of the scrapings.

Treatment. — Thorough curettement is the most satisfactory treatment. In many cases the curettement must be repeated. In rare instances the hemorrhage can be controlled permanently only by removing the uterus.

ADENOMA

Adenoma occurring in the cavity of the uterus is a condition very similar to that of hypertrophy of the endometrium, except that in the adenoma there is such an increase in the glands and in the inter-glandular substance that a tumor is formed.

Pathology. — On microscopical examination an adenoma presents practically the same picture as that of hypertrophy of the endometrium. It is most frequently confused with adeno-carcinoma. To distinguish these two it is only necessary to closely observe the epithelium lining the glands. In the adenoma, the epithelium lining the glands presents the same appearance as in a normal uterine gland. There is no piling up of the epithelium in the glands and no tendency of this epithelium to break through into the stroma. All of the glands present the same general appearance (Fig. 69). In adeno-carcinoma the epithelium lining the different glands in the same section show great variations. In a few the epithelium may appear to be normal, but in most of the glands the epithelium will be seen piling up on itself, and filling up the gland. In other places it may be seen breaking from the gland space out into the stroma.

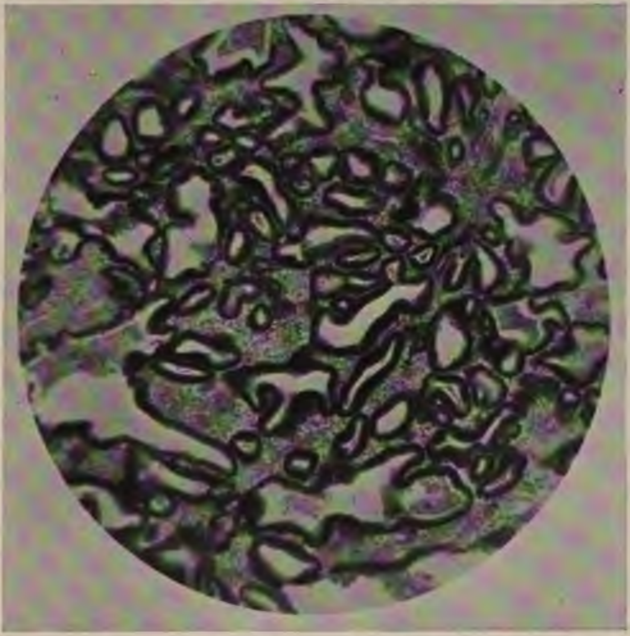


FIG. 69. — ADENOMA. (Photomicrograph.) It is noted that the numerous gland spaces are lined by a uniform thickness of epithelium.

Symptoms. — The most important symptom produced by an adenoma is uterine hemorrhage.

Diagnosis. — Diagnosis is made by microscopical examination of the growth.

Treatment. — The growth can usually be completely removed by a sharp curette.

CHAPTER XII

CARCINOMA OF THE UTERUS

Histology. — The mucous membrane of the vaginal portion of the cervix is covered with stratified squamous epithelium. The mucous membrane of the cervical canal and the glands in it are lined by a single layer of high columnar epithelium. The surface and the glands of the endometrium of the body are lined with a single layer of low columnar epithelium. From these three varieties of epithelium there develop three varieties of carcinoma. The most common form of carcinoma of the uterus develops from the squamous epithelium of the cervix and usually begins at the point of junction of the squamous and columnar epithelium. It is called squamous cell carcinoma or epithelioma. From the high columnar epithelium of the cervical canal is developed the adeno-carcinoma of the cervix. From the low columnar epithelium of the endometrium develops the adeno-carcinoma of the body of the uterus.

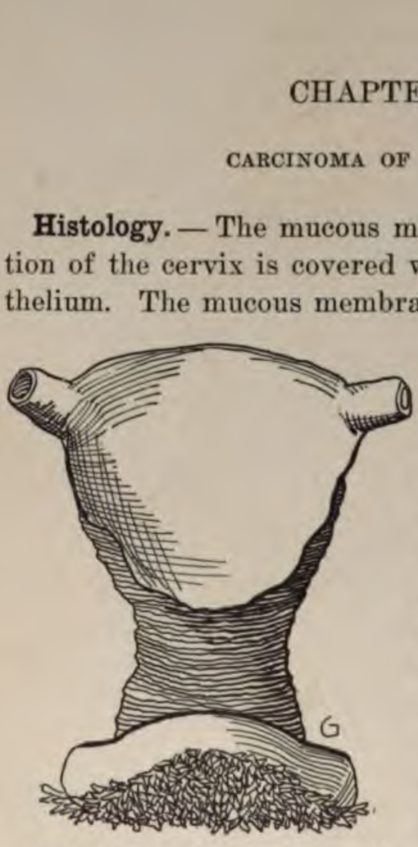


FIG. 70. — EPITHELIOMA OF THE CERVIX. A cauliflower growth.

Pathology. — EPITHELIOMA, OR SQUAMOUS CELL CARCINOMA, of the cervix is met with in various forms. These variations in appearance can be roughly classified into three groups. In an early stage the cervix presents small hard nodules with an unbroken surface, but which bleeds rather easily if manipulated. In other cases a cauliflower-like growth is found projecting from the vaginal portion of the cervix (Fig. 70). These projections are very fragile, and when broken off bleed profusely. They may be considered the second stage in the development of carcinoma of the cervix, but in many cases this formation never takes place. The third group are those observed after a certain amount of breaking down or ulceration has taken place (Fig. 71). This ulceration may follow directly after the hard nodular stage or it may follow the breaking down of the cauliflower growth. There is present a deep excavation surrounded by hard indurated nodular borders which bleed easily on manipulation. If a section of an early carcinoma of the cervix is examined with a microscope, the normal epithelium on the outside of the cervix can be traced directly to the point where it begins to dip down into the tissues and the cells change their character. It will be noted that the cancer cells stain very much more deeply than the normal vaginal epithelial cells, that they are irregular in size, and that in the connective tissue just beneath the cancerous growth

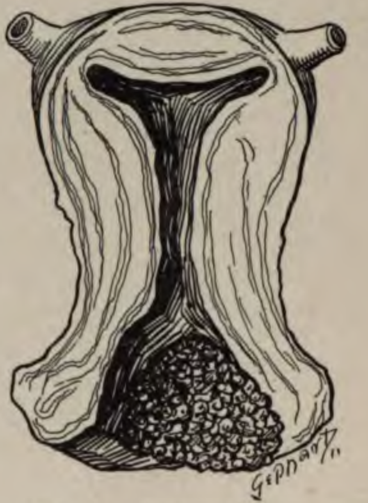


FIG. 71. — EPITHELIOMA OF THE CERVIX. The tumor has broken down leaving a cavity.

there is a marked small round-cell infiltration. The cancer cells form columns that grow directly down into the subepithelial tissues. These columns when cut transversely show what are called the cell nests. They are more or less rounded masses of epithelial cells surrounded by the stroma of the cervix which is infiltrated with small round cells.

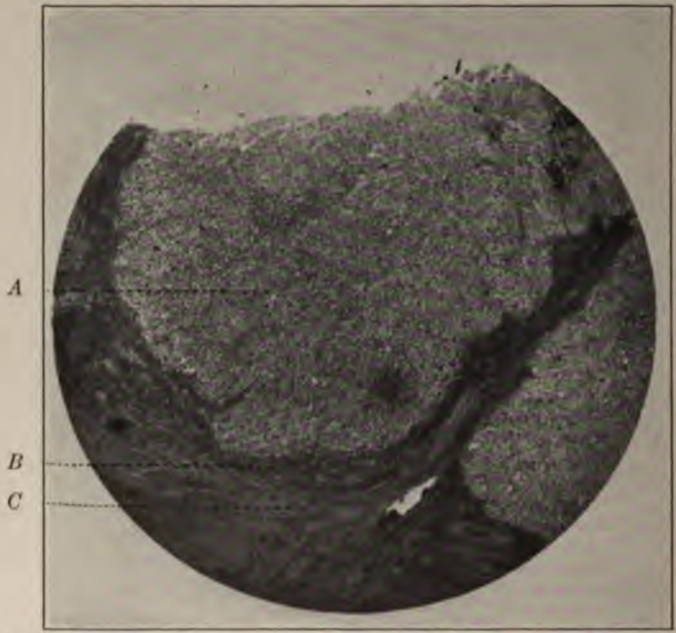


FIG. 72. — EPITHELIOMA OF THE CERVIX. (Photomicrograph.) *A*, masses of epithelial cells pushing into the cervical tissues; *B*, tissue deeply infiltrated with small round cells; *C*, cervical muscularis.

When one of the cauliflower projections is examined it is found to consist of a stem of newly formed connective tissue covered on the outside by many layers of irregular epithelial cells. In other words, the cauliflower projections are made up of an overgrowth of atypical epithelial cells combined with an overgrowth of the subjacent stroma cells. The stroma is deeply infiltrated with polynuclear leucocytes and small round cells.

When a section from the border or more recently developed portion of an epithelioma that has undergone ulceration is examined, the same cell changes are found that are seen in a beginning carcinoma. In the older portions of the growth there is much infiltration of polynuclear leucocytes into the cell nests. This process of infiltration goes on until there is liquefaction and breaking down of the epithelial masses leaving only the remnants of connective tissue between them. This connective tissue ultimately necroses, leaving a deep cavity. The cancerous process starts near the external os and rarely extends upward into the uterus farther than the internal os. It has a tendency

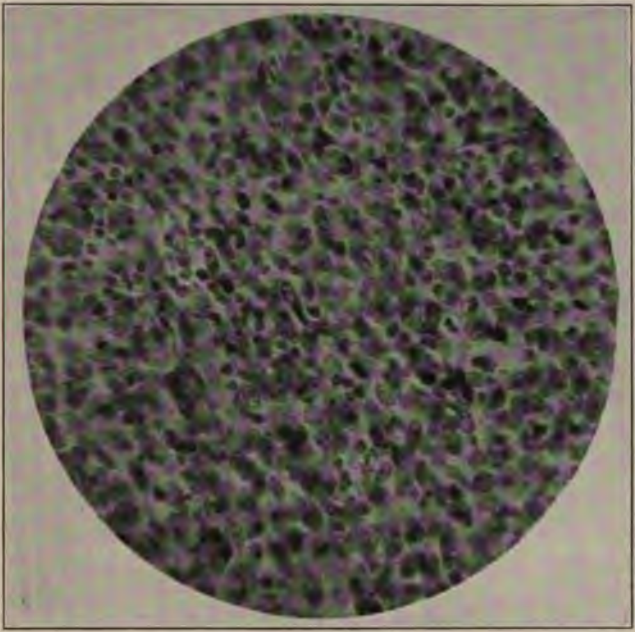


FIG. 73. — EPITHELIOMA OF THE CERVIX. (Photomicrograph.) This picture is made from the same slide that Fig. 72 is from. The higher magnification shows the character of the epithelial cells. They are irregular in size and do not stain uniformly.

to extend early into the broad ligaments by continuity of tissue, and to metastasize later by way of the lymphatics.

Three distinct varieties of squamous cell carcinoma of the cervix are recognized. The first is made up of *cells from all the layers of the epithelium.* It can usually be

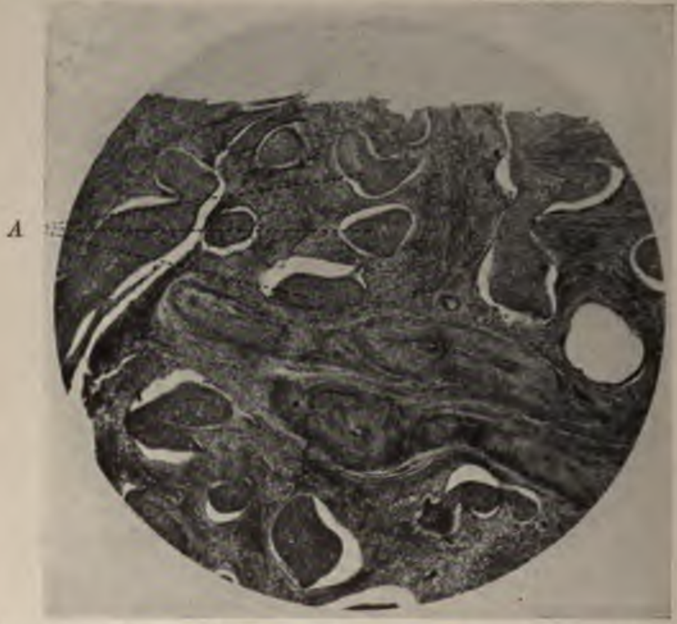


FIG. 74. — EPITHELIOMA OF THE CERVIX. (Photomicrograph.) Basal cell epithelioma. *A*, are isolated masses of epithelial cells. Under a higher magnification these cells are shown to be uniform in size and staining qualities.

recognized by the irregularity in the size of the cells and by the irregular distribution of the chromatin (Figs. 72 and 73). This type of epithelioma is the one usually found in the younger women and extends very rapidly. The second variety apparently grows only from the basal layer of epithelium and is known as *basal cell* carcinoma. The cell nests have very definitely rounded outlines (Fig. 74). It can be recognized by the uniformity of its cells both in size and in distribution of chromatin and the usual absence of pearls and prickle cells. It metastasizes less rapidly and the probability of its recurrence after removal is less than that of the first variety. In the third or *schirrus* form of epithelioma there is apparently a very slow invasion by the epithelial cells. The cells stain poorly. There is an increase in the connective tissue which apparently affords great resistance to the invading epithelial cells (Fig. 75). The result is that the malignant growth makes very slow progress and may extend over a long period of years before there is any great destruction of the tissue.

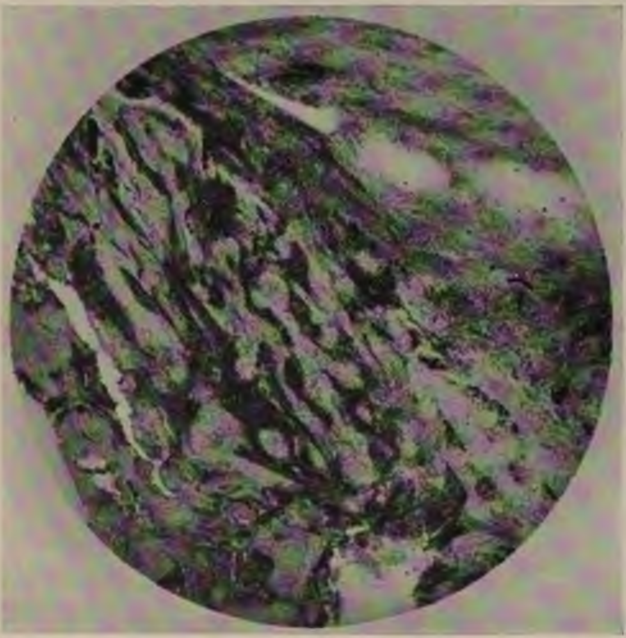


FIG. 75. — EPITHELIOMA OF THE CERVIX. (Photomicrograph.) Schirrus carcinoma. The dark areas indicate the distribution of the invading epithelium. The light areas indicate the distribution of the overgrowth connective tissue.

ADENO-CARCINOMA OF THE CERVIX often begins well up in the cervical canal and frequently progresses until the cervix is almost entirely destroyed before it breaks through into the vagina. When the disease begins in the canal near the external os the lips are thickened and infiltrated. In some cases there is almost a complete destruction of the cervix, only a hard nodular mass remaining which has a central opening in it allowing the outflow of a foul discharge. The growth sometimes entirely closes the cervical canal and the uterus becomes distended with pus. It tends to break through the rectal and bladder walls causing fistulæ. On microscopic examination a very great increase in the number of atypical glands is seen. These glands project into the stroma of the cervix. The epithelium lining the glands proliferates rapidly, having a tendency to pile upon itself and ultimately to fill up the gland spaces

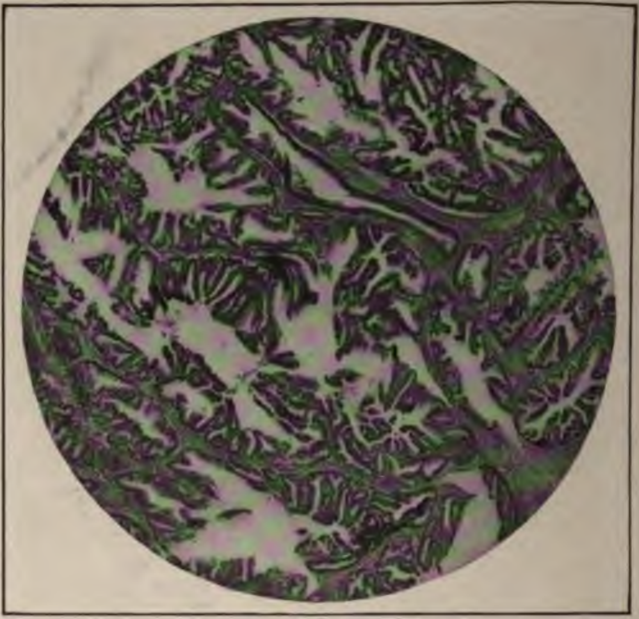


FIG. 76. — ADENO-CARCINOMA OF THE CERVIX. (Photomicrograph.) Numerous atypical glands filled with many layers of irregular epithelium are shown. Very little cervical tissue has been left.

(Fig. 76). In the later stages of the process it breaks through the basement membrane.

The epithelial cells of the adeno-carcinoma differ greatly from those of the normal cervical epithelium. The nuclei may be of almost any shape or form and stain very irregularly. The newly formed cells usually stain deeply. The stroma of the growth is the undestroyed portion of the cervical tissue and is usually infiltrated by small round cells. Adeno-carcinoma of the cervix has less tendency to break down than squamous cell carcinoma. It causes very little hemorrhage and consequently attention is rarely called to it until it is far advanced.

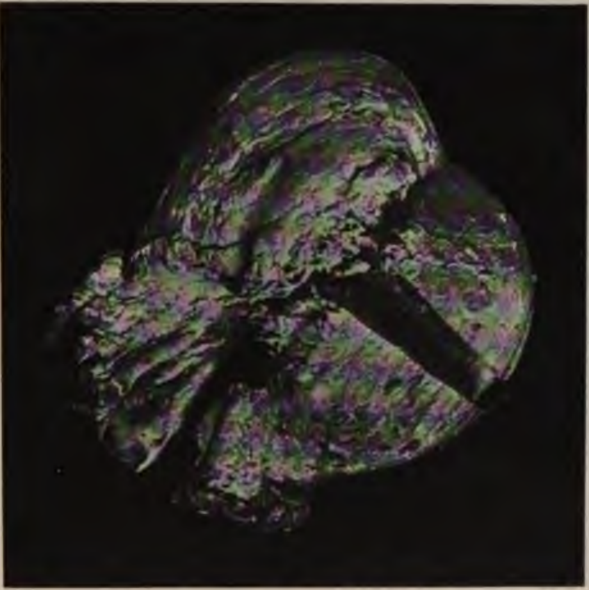


FIG. 77. — ADENO-CARCINOMA OF THE BODY OF THE UTERUS. It is noted that only the cavity of the uterus above the internal os is involved. A shaggy growth projects into the cavity of the uterus. Fig. 78 was made from a section of this uterus.

ADENO-CARCINOMA OF THE BODY OF THE UTERUS usually begins at one point in the endometrium. In exceptional cases

The two conditions most frequently confused with adenocarcinoma of the body of the uterus are a benign adenoma growing from the endometrium and the changes in the glands that are found in early pregnancy. In an early pregnancy there is an increase in the number of epithelial cells within the gland, but there is a decrease in the amount of chromatin in these cells. There is a marked uniformity in the general appearance of all the glands shown. There is no increase in the number of glands. There are present the decidual cells in the stroma.

Etiology. — No definite cause of carcinoma is known. It occurs most commonly after the age of thirty-five, although no age is absolutely exempt. The majority of cases are seen between the ages of forty and fifty-five. Lacerations of the cervix apparently favor the development of carcinoma. It has been observed that nearly all women who have epithelioma of the cervix have borne children or have had the cervix forcibly dilated. Adeno-carcinoma of the body of the uterus has been noted with greater frequency in connection with submucous fibroids than under any other condition. The presumption is that the pressure exerted by the fibroid upon the mucous membrane has a direct relation to the development of the carcinoma. It is very probable that carcinoma is due to a specific infection and that laceration of the cervix and pressure from fibroids serve only to increase the opportunities for infection.

Course. — In all forms, carcinoma of the uterus is in the beginning a local disease which, if removed completely, will not return. Epitheliomata extend early by direct continuity of tissue into the broad ligaments, and later to the other structures in the pelvis, either by direct continuity or by way of the lymphatics. The patient loses strength rapidly from the continuous loss of blood and from the toxemia.

Carcinoma is one of the few pathological changes that produces hemorrhage after the menopause. All cases that bleed excessively about the time of the menopause and all cases that bleed even slightly after the establishment of the menopause should be immediately investigated. The squamous cell carcinoma does not cause hemorrhage until after it begins to break down. The adeno-carcinoma of the cervix may never cause any hemorrhage. Adeno-carcinoma of the body of the uterus occurring before the establishment of the menopause causes at once an increased menstrual flow. Where the growth begins after the establishment of the menopause the hemorrhage is usually, in the beginning, a slight continuous dribble which has a tendency to increase in volume.

Even before hemorrhage occurs there is frequently a thin watery discharge. Unfortunately leucorrhea is such a common condition that usually very little attention is paid to the discharge due to a malignant growth. As the disease progresses this watery discharge becomes discolored with blood. During the process of necrosis there is a profuse extremely fetid discharge. It has a tendency to irritate the mucous membranes over which it passes. The odor is so characteristic that it is a very material aid to diagnosis.

Pain due to carcinoma does not begin until after the structures outside the uterus are involved. There is nothing characteristic about it and it varies according to the organs involved in the metastases. It usually comes on too late to be of any practical use in making a diagnosis.

The cachexia caused by carcinoma does not appear until the disease is well advanced and is due to the absorption of toxins and to the loss of blood.

Diagnosis. — It is of the greatest importance to make a diagnosis of carcinoma as early as possible. The diagnosis of epithelioma of the cervix can usually be made by ordinary vaginal examination. The cervix may be found to present irregular nodules, a cauliflower growth, or a crater-like ulcer with hard, elevated edges. Some hemorrhage is almost invariably produced by the examination. The condition of the cervix taken in connection with the age of the patient and the history of hemorrhage are very significant of carcinoma. A portion of the growth for microscopical examination can be obtained either by curettement or by clipping a wedge-shaped portion from the border of the growth. The microscopical findings are described in the paragraph on pathology.

Adeno-carcinoma of the cervix as a rule causes no enlargement of the cervix and no hemorrhage or other discharge until it has extended very widely and begins to break down. An early diagnosis of adeno-carcinoma of the cervix is usually only made in the course of routine microscopical examination of uterine scrapings. In adeno-carcinoma of the body of the uterus attention is usually directed to the condition by the hemorrhage. On bimanual examination it can usually be recognized that the body is slightly enlarged. The diagnosis must be made from a specimen secured by curettement. The microscopical findings are described in the paragraph on pathology.

Treatment. — The ideal treatment for carcinoma of the uterus is the extirpation of all tissues involved in the growth. Unfortunately in many instances the carcinoma has extended into tissues so far beyond the uterus before it is discovered that it is impossible to remove the whole of it. In such cases it is folly to attempt a radical operation, and the attending physician should restrict the treatment to palliative measures for the relief of symptoms as they arise. There are no hard and fast lines by which these cases may be separated into the two groups — one in which complete removal should be attempted and the one in which only palliative measures should be used. In a general way it can be stated that palliative treatment should be used in those cases in which, by ordinary methods of examination, it can be recognized that the carcinoma has extended beyond the uterus, and especially those in which the broad ligaments are involved to such an extent that the uterus is fixed in a definite position; and that in all cases where the uterus is movable and where there is no marked infiltration of the tissues outside of the uterus, extirpation of the growth should be undertaken.

PALLIATIVE TREATMENT. — By palliative treatment we mean treatment that is administered for the relief of symptoms as they arise. These symptoms are hemorrhage, pain, and odor from the discharge.

For the relief of hemorrhage the most efficient measure is the use of the curette either with or without the cautery. A sharp curette that is as wide as can be introduced into the cervical canal should be used and each stroke of the curette should be carried down as nearly as possible to the healthy tissue. When the curettage is done in this way there is less loss of blood than when the same area is scraped over several times. After the entire exposed area has been curetted, the raw surface should be seared over with a low temperature cautery. This stops the oozing and destroys a little more of the malignant growth than can be removed with a curette. If the bleeding is not entirely controlled a temporary gauze pack should be put in.

For the relief of pain morphia should be administered in sufficient quantities to make the patient comfortable without any reference to the amount necessary.

To control the odor of the discharge vaginal douches of a weak solution of permanganate of potassium, boracic acid, or normal salt solution may be used. These may be used alternately. The solution of permanganate of potassium is the most efficient, but it is not advisable to use it exclusively.

RADICAL TREATMENT. — The operations for the extirpation of carcinoma of the uterus may be divided into three groups: they are high amputation of the cervix, vaginal hysterectomy, and abdominal hysterectomy.

High Amputation of the Cervix. — Even in the most advanced cases epithelioma of the cervix rarely extends into the uterus beyond the internal os. On account of this fact a high amputation of the cervix with the removal of a wide section of the lower half of the broad ligaments offers as great a possibility for the complete removal of the disease as does a hysterectomy.

The operation is done by exposing the cervix by means of a vaginal speculum, making a circular incision around it, dissecting back a cuff of mucous membrane, and laying bare the cervix nearly or quite to the internal os. The lower segments of the broad ligaments of both sides are clamped as far from the cervix as possible. The broad ligaments are cut through close to the clamps and the cervix amputated near the internal os. The stumps of the broad ligaments are cauterized and the clamps are left in position. A ligature is put into each side of the stump of the cervix to control the small blood-vessels, and is made to include the ascending portion of the uterine artery. The edge of the median part of the wound in the mucous membrane of the anterior vaginal wall is drawn down and stitched to the endometrium on the anterior side of the cervical canal with two or three sutures. The same procedure is carried out posteriorly. By this means the stump of the cervix is almost covered with mucous membrane and the cervical canal is preserved. One or two stitches in the vaginal mucous membrane on either side of the cervical canal brings together the mucous membrane over the remainder of the stump of the cervix. The clamps on the broad ligaments are allowed to remain in position forty-eight hours.

Vaginal Hysterectomy. — Before proceeding with the operation of vaginal hysterectomy, especially for the removal of epitheliomata, the involved area should be curetted and cauterized or amputated. This preliminary work may be done immediately before the operation, or some operators prefer to do it several days in advance of the operation. The object is to remove the infected areas and decrease the probability of infection of the peritoneum and denuded tissues during the operation. The hysterectomy is started by making a circular incision through the vaginal wall around the cervix (Fig. 57). This incision should be car-

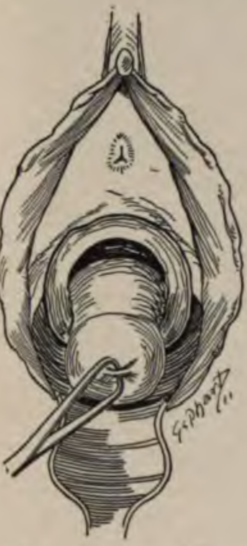


FIG. 79. — VAGINAL HYSTERECTOMY. First step. A circular incision has been made around the cervix and the mucous membrane dissected up as is shown in Figs. 57 and 58. The peritoneum between the uterus and the bladder has been opened.

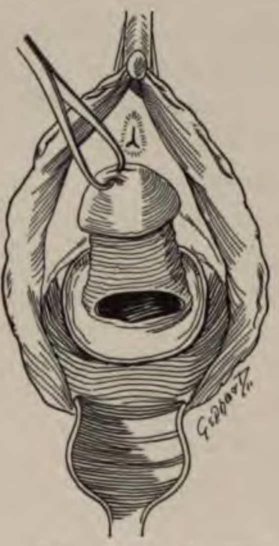


FIG. 80. — VAGINAL HYSTERECTOMY. Second step. An opening has been made into Douglas' cul-de-sac.

ried as far from the involved portion of the mucous membrane as possible. By blunt dissection a cuff of the vaginal wall is separated from the uterus on all sides (Fig. 58). Behind, the dissection is carried back to the peritoneum. In front, the working space can be much increased by splitting the anterior vaginal wall in the median line. The bladder is separated from the uterus and pushed as far forward as possible. The farther it is separated from the uterus the less danger there is of injuring either it or the ureters during the operation. The peritoneum is opened by a long transverse incision both in front of and behind the uterus (Figs. 79 and 80). The lower segments of the

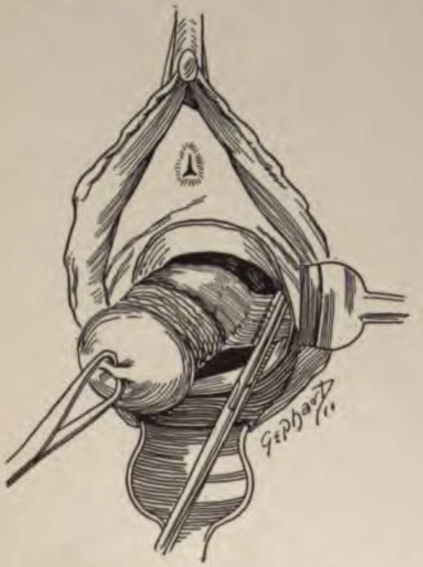


Fig. 81. — Vaginal Hysterectomy. Third step. The clamp to the left of the uterus is on the lower segment of the left broad ligament. The dotted line indicates the line of incision to be made through the lower part of the broad ligament.

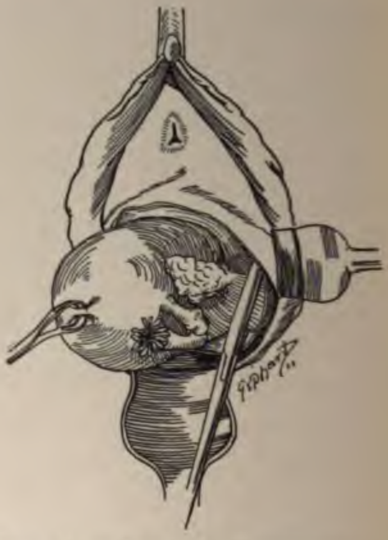


Fig. 82. — Vaginal Hysterectomy. Fourth step. The fundus of the uterus has been turned forward by the method shown in Fig. 28. The clamp is on the upper segment of the broad ligament.

broad ligaments are clamped as far from the uterus as possible and cut free (Fig. 81). The fundus of the uterus is then turned downwards through the wound in the anterior vaginal wall and brought to the outside (Fig. 28). The upper portions of the broad ligaments are clamped (Fig. 82), and incisions are carried down between the clamps and the uterus to meet the incisions made through the lower segments of the broad ligaments. The uterus is then removed. The stumps of the broad ligaments are cauterized down to the clamps, and the clamps sufficiently heated with the cautery to destroy the vitality of the tissues grasped. A large loose gauze pack is pushed up into the pelvis between the clamps and a piece of gauze is wrapped around the clamp handles. After forty-eight hours the clamps are removed and in another twenty-four hours part of the gauze packing is removed. After that a portion of the pack is removed every day. The last part is usually removed the seventh day after the operation.

Abdominal Hysterectomy. — The advocates of abdominal hysterectomy for carcinoma claim that a wider area of the broad ligaments can be removed by that route than by way of the vagina, and that through the abdominal wound the lymphatic glands may also be removed. It has been demonstrated that metastasis takes place most frequently by direct continuity of tissue into the broad ligament. As a matter of fact just as wide a dissection can be made of the broad ligaments by the vaginal as by the abdominal route. In only about thirteen per cent of all cases are the removable pelvic glands alone involved. It is impossible to tell by macroscopical examination whether the glands are involved or not. Many glands that are seen to be enlarged are not cancerous, but the enlargement is due to a bacterial infection. Many glands not materially enlarged may be proved by microscopical examination to be cancerous. When the most radical operation is done there always remains a doubt as to whether all the infected glands have been removed. Small cancerous glands in the pelvis are easily overlooked and no attempt is made to remove the abdominal glands into which a portion of the uterine lymphatics directly drain. Up to the present time the mortality due to the extensive dissection made necessary by the attempt to remove infected glands has remained very high. This high operative mortality more than counterbalances the permanent recoveries secured by the removal of the pelvic glands. For these reasons it is believed that there is no advantage in the abdominal over the vaginal hysterectomy, except when there are adhesions due to infection or when there are other pelvic growths, either uterine or ovarian, that cannot be dealt with through the vagina.

The patient is put in the Trendelenburg position. An abdominal incision is made in the median line from close to the symphysis to a point high enough up on the abdomen to give abundance of room. The intestines are packed off. The broad ligaments are clamped and opened. The bladder is separated from the uterus. The ureters are isolated. The uterine arteries are clamped close to their origin. The lower portions of the broad ligaments are cut through as near the pelvic wall as possible. An incision is carried through the vaginal wall around the cervix, leaving a wide cuff of vagina attached to the cervix. The uterus is then removed. The ovarian arteries in the upper portions of the broad ligaments are tied. The uterine arteries are tied. It is sometimes necessary to put a running over-and-over stitch around the cut borders of the vaginal wall to control the bleeding from the small vaginal vessels. A stitch is put into the lateral walls of the vagina on each side and carried through the stump of the corresponding broad ligament. This stitch assists in covering over the denuded areas and prevents a subsequent prolapse of the vagina. The raw surfaces are then covered over with peritoneum. A pack is pushed down through the opening into the vagina and enough of it left in the pelvis to prevent the intestines from coming down in contact with the opening.

CHAPTER XIII

SARCOMA, CHORIO-EPITHELIOMA, SUBINVOLUTION, AND SUPERINVOLUTION OF THE UTERUS

SARCOMA OF THE UTERUS

Sarcoma is a malignant growth developing from connective tissue. It may occur at any age.

Pathology. — Sarcoma may begin either in the stroma cells of the endometrium or in the fibrous connective tissue in the uterine wall. Sometimes it is present as a diffuse growth. This is particularly apt to occur when it has developed from the stroma cells of the endometrium. When it develops from the uterine wall it usually forms a rounded tumor. Sarcoma also develops in uterine fibroids. When it develops in a uterine fibroid it involves not only the connective tissue, but also the muscle cells. Sarcoma of the uterus may be made up of round cells, spindle cells, or a mixture of these two varieties. The round-cell sarcoma is made up of round cells having relatively large nuclei and a limited amount of protoplasm. A spindle-cell sarcoma is composed of large and small elongated cells arranged in bundles. A cross section of these spindle cells may appear as round cells. Two or more nuclei are seen. The amount of chromatin in the sarcoma cells is variable. There is a variable amount of connective tissue framework distributed throughout the growth. The newly formed blood-vessels are abundant. The secondary changes of sarcoma do not begin so early and are not so frequent as in carcinoma, because the sarcoma cells have a rich and direct blood supply. Metastasis is by way of the blood and lymphatic vessels.

Symptoms. — The symptoms produced by sarcoma are usually the same as those caused by carcinoma, hemorrhage and pain. Later when it becomes necrotic there is a bloody foul-smelling discharge.

Diagnosis. — The tumor mass is softer than that of an ordinary fibroid. Sometimes it forms a rounded mass that projects through the cervix. It is soft on palpation and large blood-vessels are seen crossing over its surface. As a rule the diagnosis is not made until after removal.

Treatment. — The treatment is a complete vaginal or abdominal hysterectomy.

CHORIO-EPITHELIOMA

(*Deciduoma Malignum, Syncytioma Malignum*)

Pathology. — Chorio-epithelioma is a malignant tumor which develops from the syncytial cells and the Langhan's cells of the chorion (Fig. 83). In the majority of instances the growth is preceded by an hydatiform mole, but it may develop after a normal pregnancy that has terminated either at full term or in a miscarriage. The original tumor is usually found in the uterine wall, but occasionally a case is met with in which no uterine growth can be demonstrated. It forms a soft reddish friable mass. On microscopical examination there are found numerous large clear cells with vesicular nuclei and masses of protoplasm which contain a few deeply staining nuclei. The individual cells are derived from the Langhan's layer and the protoplasmic masses from the syncytium (Fig. 84). Making up a large part of the bulk of the tumor are large unlined spaces filled with blood. There is an entire absence of formed vessels.

On account of the erosive action of the chorionic epithelium these growths readily penetrate the walls of the blood-vessels of the uterus, and entering the general circulation, are carried to all parts of the body. This results in the very early development of metastatic growths in the vagina, kidneys, liver, lungs, brain, and other parts of the body. The metastatic growths are similar in gross appearance and identical histologically with the original growth. All chorio-epitheliomata break down earlier than other malignant growths.

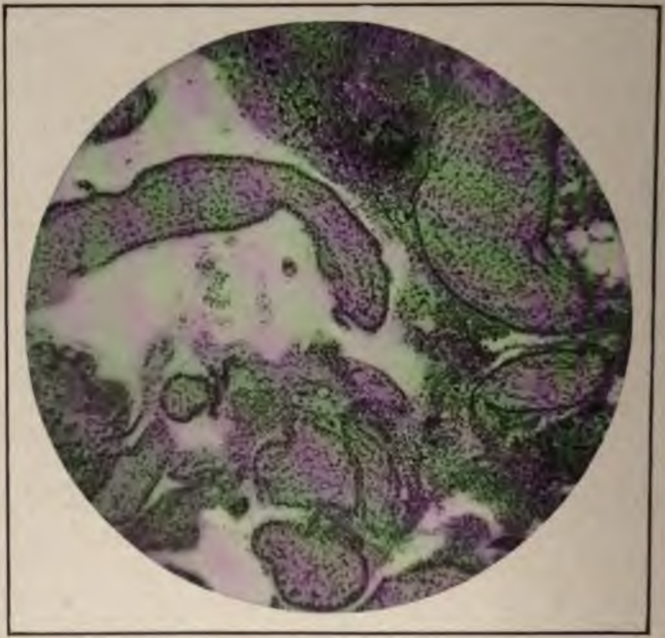


Fig. 83. — Chorionic Villi. (Photomicrograph.)

Symptoms. — The most important symptom is a more or less continuous hemorrhage from the uterus that dates from the passage of a uterine mole, a labor, or a miscarriage. The blood is somewhat modified by the mixture from the necrotic areas. A curettement does not permanently control the bleeding.

Prognosis. — If removed early and before metastasis has taken place, there is a possibility of permanent recovery. In the cases where metastasis has taken place, the progress is rapid and the termination is always fatal. The whole period covered by the disease is rarely more than six months.

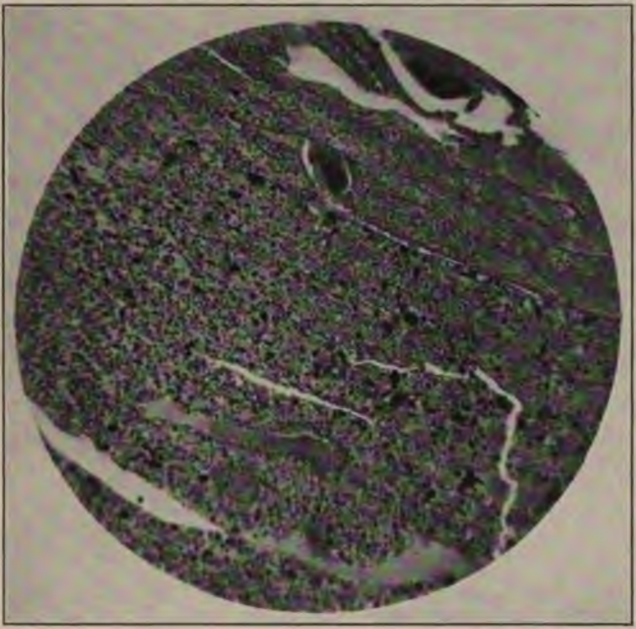


FIG. 84. — CHORIO-EPITHELIOMA. (Photomicrograph.)

Treatment. — As soon as the diagnosis is made a complete hysterectomy should be done.

SUBINVOLUTION

Subinvolution of the uterus is a failure of the uterus to return to its proper size after the termination of pregnancy.

Pathology. — **There is usually a low grade of infection of the endometrium and the uterine wall. Frequently associated with this infection are lacerations of the cervix, retrodisplacement of the uterus, laceration of the perineum, or salpingitis.**

Symptoms. — **There is a history of a comparatively recent labor. The patient complains of pain in the back and a sense of weight and dragging in the pelvis. There is a leucorrheal discharge. The menstrual flow is increased.**

Diagnosis. — On bimanual examination the uterus is found to be uniformly enlarged. It is firm on pressure and usually somewhat tender. When there is no involvement of the tubes the uterus is movable. The condition is most likely to be confused with a small fibroid or an early pregnancy. When the enlargement of the uterus is due to a fibroid, usually there will not be a history of a recent pregnancy. The cervix will not be enlarged in proportion to the body, and in nearly all cases a more or less definite rounded mass indicating the position of the fibroid can be felt. In early pregnancy there will be an absence of menses. Usually there is morning sickness. The breasts will be enlarged and tender on pressure; the papillæ around the nipples become prominent, the veins in the breasts are enlarged, and there may be some slight secretion from the breasts. The cervix is hard except just around the external os, where it is softened and has a velvety feel. The body of the uterus is globular and feels like a cyst. There is some discoloration of the vagina and cervix.

Treatment. — In many cases all that is necessary in the treatment of subinvolution is to put the patient in bed. Glycerin tampons, to deplete the congestion of the uterus, and hot vaginal douches are useful. When these measures fail, involution may be promoted by thorough curettement. When there are lacerations of the cervix or perineum, it is necessary to repair them.

SUPERINVOLUTION OF THE UTERUS

When the process of involution after labor goes on until the uterus is reduced much below its normal size it is said to be in a condition of superinvolution. This occurs rarely, but the uterus is left in about the same condition as when it has failed to develop and has associated with it very much the same symptoms as are associated with the congenitally defective uterus. The menses are usually diminished and very painful.

CHAPTER XIV

UTERINE FIBROIDS

The uterine fibroid, fibromyoma, or myoma is a benign tumor originating in the uterine wall and made up of the same histological elements, connective tissue and unstriped muscular fibers, that make up the normal uterine wall.

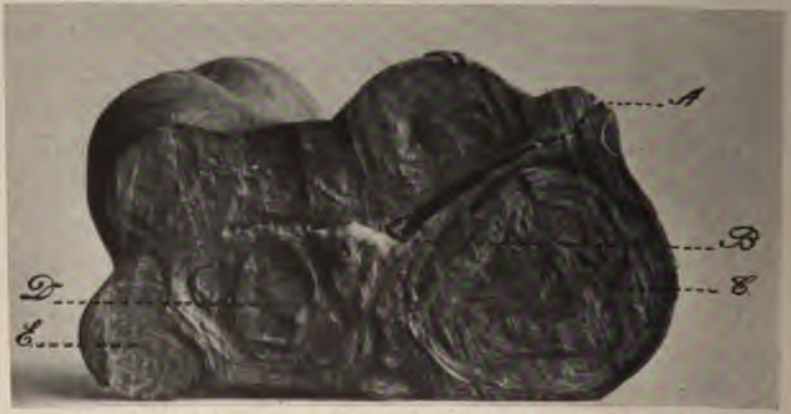


FIG. 85. — MULTIPLE FIBROIDS. *A*, external os; *B*, internal os; *C*, cervical fibroid; *D*, submucous fibroid; *E*, subperitoneal fibroid.

There are connective tissue and muscular fibers present in all these tumors, but their relative proportions vary widely. When connective tissue makes up the bulk of the tumor it is called a fibroid. When muscular tissue predominates it is called a myoma. When there is a more equal distribution of the two tissues, the term "fibromyoma" is used. An adeno-fibroma has growing within it glands that are an extension from and only a slight modification of the normal uterine glands. The term "fibroid" is the one that is generally used in referring to this class of tumors.

Classification According to Position. — According to their relation to the uterine wall, fibroids are spoken of as subperitoneal, submucous, interstitial, interligamentous, and cervical.

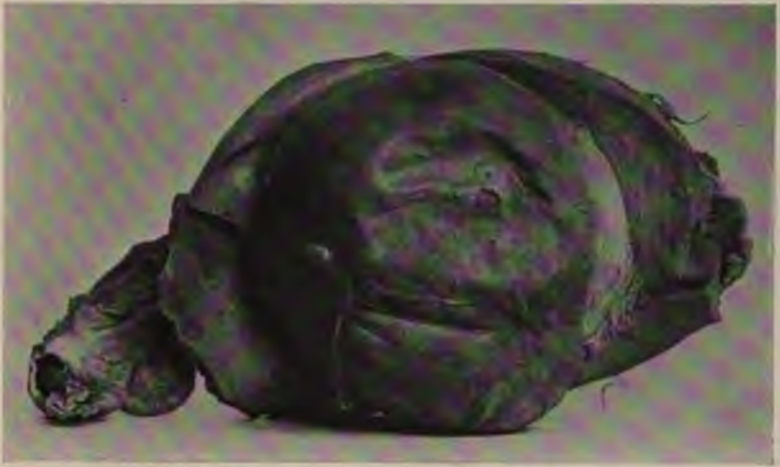


FIG. 86. — SUBMUCOUS FIBROID.

A *subperitoneal fibroid* is one that is situated just beneath the peritoneum.

A *submucous fibroid* is one that grows just beneath the mucosa.

An *interstitial fibroid* is one that is located in the uterine wall about the same distance from the peritoneum as it is from the mucosa.

An *interligamentous fibroid* is one that has developed from one side of the uterus and grows out between the layers of the broad ligaments.

A *cervical fibroid* is one that has developed from the cervix. When a cervical fibroid develops just beneath the peritoneum of the posterior cervical wall, it is sometimes called a retroperitoneal fibroid.

Pathology. — All fibroids begin to develop in the muscular wall of the uterus. The tumors in which fibrous connective tissue predominates are firm, white, rounded masses of extremely variable size that do not infiltrate but push aside the tissues of the uterine wall. The displaced uterine tissues form the so-called capsule from which the tumor can be readily separated. The blood supply is almost entirely in the capsule. The vessels that penetrate the tumor are very insignificant.

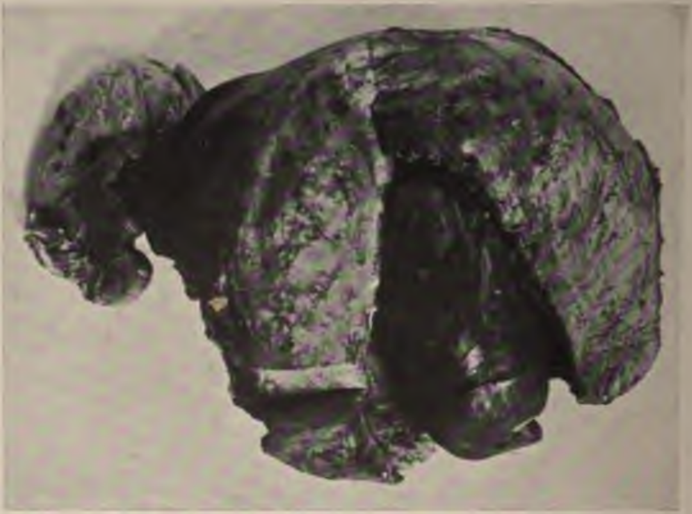


FIG. 87. — FIBROID POLYPUS.

Contractions of the uterine muscular fibers cause these tumors to migrate in the direction of least resistance. As a result of this migration tumors that were originally interstitial may become either submucous or subperitoneal, and a continuation of the migration converts sessile submucous and subperitoneal tumors into pedunculated tumors. In exceptional cases both submucous and subperitoneal tumors become entirely detached from the uterus. The detached submucous tumor may be forced entirely out of the vagina. The detached subperitoneal fibroid may undergo necrosis, but usually it becomes attached to some of the abdominal viscera from which it receives a blood supply.

The myomata grow more intimately with the uterine tissues and have little or no tendency to form a capsule. The adeno-fibromyomata cannot be readily separated from the surrounding tissues in which they grow. In the myomata and the adeno-fibromyomata which have no capsule the blood supply to the tumor is much more abundant than in the connective tissue tumors.

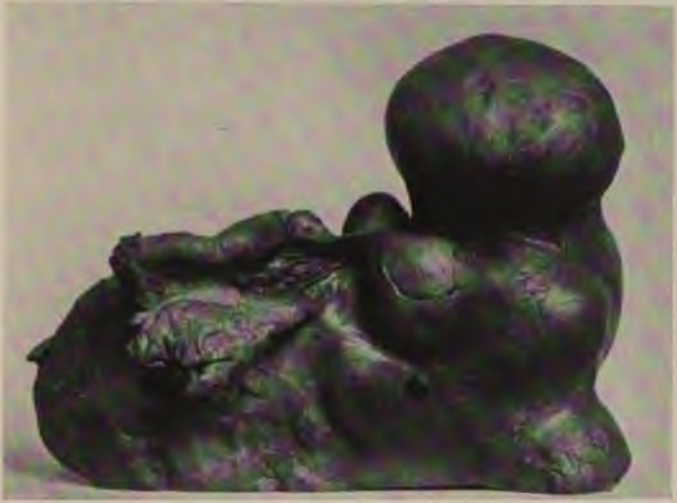


FIG. 88. — SUBPERITONEAL FIBROID.

In practically all cases of uterine fibroids the ovarian and uterine arteries are enlarged and the uterine muscularis and mucosa are hypertrophied. The depth of the uterine canal is increased. Large varicose veins develop in the broad ligaments. The ovaries are frequently hypertrophied. The tubes are frequently enlarged, but not otherwise changed unless they are infected. Microscopically it is seen that the cell elements of the tumor are the same as the normal uterine wall. The unstriped fusiform muscle fibers have a tendency to be arranged in whorls (Fig. 89). The proportion of the fibrous connective tissue to the muscular tissue varies greatly. The firm, hard, white tumors that develop very slowly are composed almost entirely of fibrous tissue. The soft reddish colored, rapidly growing tumors are made up almost entirely of muscular fibers. Between these two extremes there is found every possible variation and combination of muscular and fibrous tissue. The adeno-fibromyoma is a growth that seems to be due to the penetration into the uterine wall of typical glands from the endometrium and the formation around

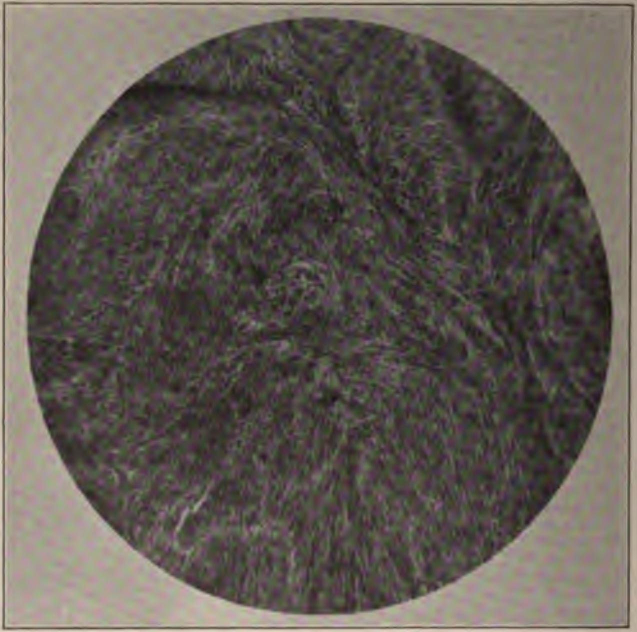


FIG. 89. — FIBROMYOMA. (Photomicrograph.)

these invading glands of an excess of fibrous tissue (Fig. 90).

Secondary Pathological Changes. — These changes include fatty, hyaline, cystic, and calcareous degeneration; septic infection; sarcoma; and carcinoma.

Fatty degeneration affects the muscle fibers and may completely destroy them, leaving behind only the contracting fibrous tissue. This is the process that takes place when fibroids spontaneously decrease in size.

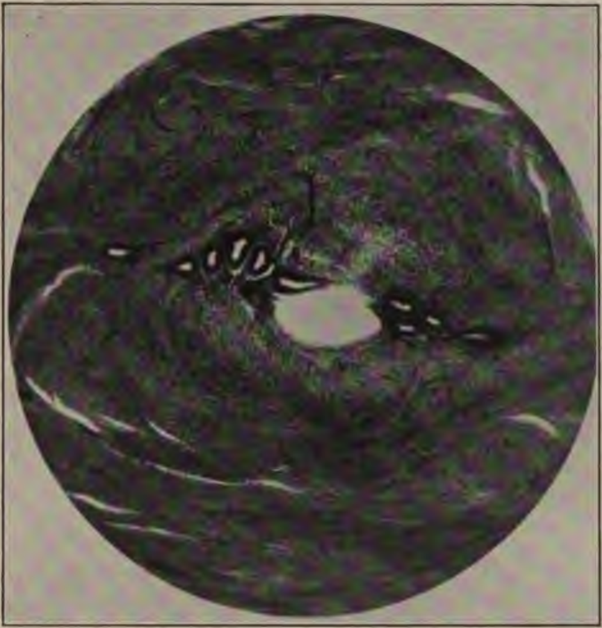


Fig. 90. — Adeno-fibromyoma. (Photomicrograph.)

Hyaline degeneration takes place in practically all fibroids. In the earlier cases the hyaline changes may be recognizable only by the microscope. Later large areas are involved and may be recognized by the naked eye. The hyaline areas are almost devoid of cell elements. As the process goes on some of these hyaline areas liquefy, resulting in the formation of fluid-filled cavities. This condition is ordinarily recognized as *cystic degeneration* of a fibroid. There is also a rarer form of cystic degeneration resulting from the accumulation of fluid in the lymph channels.

Calcareous degeneration consists of the deposit of lime salts within the tumor. It is secondary to a diminished blood supply and is most frequently seen in pedunculated subperitoneal fibroids.

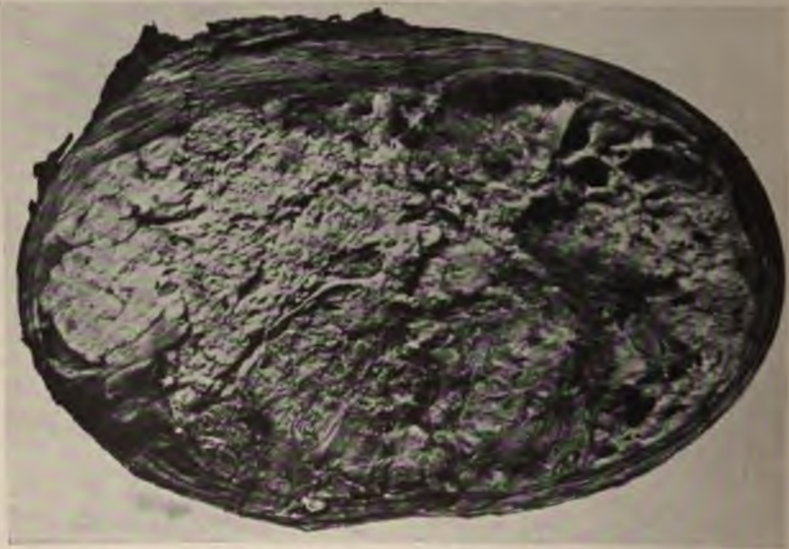


FIG. 91. — FIBROID UNDERGOING CYSTIC DEGENERATION.

When the blood supply to a submucous fibroid is cut off, it undergoes *necrosis*. Along with this necrotic process there is usually an infection not only of the tumor, but of the tissues from which the tumor has become detached. This is an extremely dangerous complication.

Sarcoma develops in from one to four per cent of all fibroids. The operators who have had their specimens most carefully examined have found the highest percentage fibroids, but it is difficult to establish any definite relation between the two growths. The carcinoma may be of the squamous cell variety of the cervix or an adeno-carcinoma developing from the endometrium. It is improbable that there is any definite relation between the squamous cell carcinoma of the cervix, and the associated fibroid. It has been noted that adeno-carcinomata are met with more frequently in association with submucous fibroids than when no fibroids are present. An adeno-carcinoma does not start on the part of the mucous membrane directly over the fibroid, but as a rule on the opposite uterine wall where the pressure from the fibroid is greatest. It is reasonable to suppose that this pressure from the fibroid has something to do with starting the growth. There is the possibility of a carcinoma starting from the epithelium of the glands in an adeno-fibromyoma.

Rate of Growth. — Generally speaking the rate of growth of fibroid tumors is slow. Those that are made up most largely of muscular elements develop most rapidly. Hard fibrous tumors develop very slowly. It is impossible to predict with any accuracy the rate of development of any given fibroid. One that has been present and has been known to be developing very slowly may suddenly begin to grow and enlarge with great rapidity. On the other hand many fibroids will go on growing slowly for several years, and then entirely stop increasing in size. When a fibroid that has been growing slowly begins to develop with unusual rapidity, this increase in size may be due to the rapid ncrease of its muscular elements, but it is very often due o sarcoma.

Period of Growth. — Fibroids develop during the men- o f women. They are rare before the age of no doubt very unusual for them to begin age of forty-five. The largest number of fibroids are seen in women in the decade from thirty to forty. It has long been taught that after the establishment of the menopause, fibroids undergo fatty degeneration and gradual absorption. This is true in some cases, but in very many instances fibroids continue to increase in size and may even increase in size at a much more rapid rate after the establishment of the menopause than previously. Such a small percentage of women are relieved of the symptoms produced by fibroids by the establishment of the menopause that it is unwise to advise these patients to postpone operative relief in the hope that with the establishment of the menopause they will have no further trouble.

Number. — There is apparently no limit to the number of fibroids that may develop in a uterus. Very frequently there is only one, but multiple fibroids up to a dozen are common. As many as forty have been found in a single uterus. Ordinarily the fibrous tissue appears in perfectly definite, localized nodules. Occasionally there is a growth of fibrous tissue throughout the whole uterus.

Size. — Fibroids vary in size from a microscopic point up to the size of a full-term pregnancy. Fibroids large enough to fill the pelvis and project half-way to the umbilicus are comparatively common. Enormously large ones are very rare.

Complications of Fibroids. — One of the most frequent complications of fibroid tumors is infection of the tubes. This infection may result in extensive adhesions that bind the tumor firmly in the pelvis and greatly increase the difficulty of operation. Abscess cavities, also, may result from the infected tubes, increasing very materially the hazard of operation for the removal of the fibroids. Where there is an accumulation of much pus and it is possible to do so, it is best to drain the abscess cavity through the posterior vaginal wall some weeks before any attempt is made to remove the fibroid. Infection of the tubes is a contraindication for myomectomy. Supravaginal hysterectomy with drainage through the posterior vaginal wall is the operation that is applicable to most of these cases.

The ureters may be displaced or obstructed by the growth of fibroids. The obstruction may result in dilatation of the ureter and of the pelvis of the kidney.

Uterine displacements may result from the position of the growth. A relatively small fibroid growing either anteriorly or posteriorly in the body of the uterus near the fundus may cause a retrodisplacement. Large fibroids growing out into the broad ligaments will push the uterus to the opposite side of the pelvis. A submucous fibroid occasionally produces inversion.

7 **Fibroids and Pregnancy.** — Submucous fibroids as a rule cause sterility. A pregnancy may take place when fibroids are present so long as the cavity of the uterus is not materially affected. Pregnancy, of course, is most frequently seen associated with subperitoneal fibroids, but much more serious is a pregnancy complicated by a large cervical fibroid that obstructs the pelvic canal.

Pregnancy in connection with fibroids can usually be recognized by the cessation of the menses, the rapid increase in size of the tumor, and the other signs of pregnancy. In dealing with this complication each case must be judged separately. In a very large proportion there is no occasion to interfere. In some of the larger subperitoneal tumors an abdominal myomectomy may be done to advantage. In exceptional cases it may be advisable to do a hysterectomy in spite of the pregnancy. A pregnancy complicated by a large cervical fibroid may be allowed to go to a full term, when the child can be delivered by Cæsarean section or by a Porro operation.

Symptoms. — Hemorrhage is the most common symptom of fibroids. The submucous variety gives rise to the greatest amount of bleeding. The interstitial produces little hemorrhage and the subperitoneal usually causes none. The hemorrhage generally begins as a slightly increased flow at the menstrual period. The length of the periods is gradually increased until in some cases there is an almost continuous flow. The quantity of the blood lost at any one time is usually not large, but the persistence of the flow may be sufficient to produce a grave anemia. Exceptionally there will be a sudden flow of blood sufficient to cause fainting. The adeno-fibromyomata usually cause very profuse hemorrhages. The conditions that favor hemorrhage when submucous fibroids are present are the blood supply in the capsule of the tumor, the presence of an hypertrophic endometrium, and the inability of the uterus on account of the presence of the tumor to contract upon the bleeding point.

Pain is a common but not a constant symptom of fibroids. Sometimes it is due to the contraction of the uterus on the tumor. Pain due to this cause is intermittent. Ordinarily the discomfort complained of is a sense of pressure and weight in the pelvis with pain in the back. The pain is increased at the menstrual period. A sudden increase of pain and tenderness indicates that some new pathological process has been lighted up. Leucorrhea is present in the same class of cases that have hemorrhage. It is most marked during the congestion of the endometrium just before and just after the menstrual periods. Frequent urination is present in those cases in which the tumor is in such a position that it presses on the base of the bladder, or when the capacity of the bladder is restricted. Constipation, hemorrhoids, and occasionally rectal tenesmus result from pressure on the lower bowel.

Diagnosis. — Fibroids that are large enough to project above the brim of the pelvis can be detected by abdominal examination. When the patient is in the recumbent position it is noted by inspection that the lower portion of the abdominal wall is elevated above the level of the line running from the symphysis to the ensiform appendix. The elevated area, being due to a tumor that is very slightly compressible, is often very sharply defined. Above this area the line of the abdominal wall drops abruptly to near the level of the ensiform appendix. The portion of the abdominal wall between the ensiform appendix and the highest point of the tumor rises and falls with each inspiration and expiration, while the portion of the abdominal wall from the highest point of the tumor to the symphysis remains almost stationary. There is an absence of pigmentation in the median line of the abdomen. The breasts are not enlarged, and there is an absence of pigmentation around the nipples and no enlargement in the veins of the breasts. There is an absence of secretion in the breasts. On palpation a rounded or nodular firm tumor can be felt rising from the pelvis. The rapidly growing myomata or fibromyomata which have undergone extensive cystic degeneration may feel so soft as to be indistinguishable by palpation from a pregnant uterus or from an ovarian cyst. On

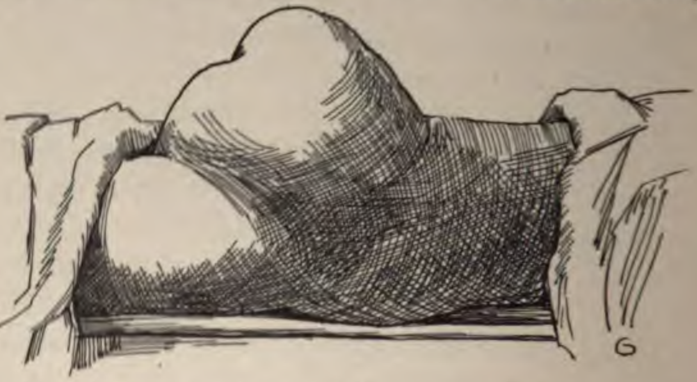


FIG. 93. — OUTLINE OF ABDOMEN CONTAINING A LARGE FIBROID.

percussion the elevated portion of the abdominal wall is dull. The intestines lie above and to the sides of the growth. The percussion note over them is tympanitic. As a rule the only point gained on auscultation is negative; that is, the absence of fetal heart sounds.

On bimanual examination a hard uterine tumor can be made out. It is usually easily movable and the cervix moves with the tumor. If there is an associated salpingitis, the resulting adhesions limit the mobility. The essential thing to make out ordinarily is that the tumor present is a uterine growth and that it is hard. The exceptional soft fibroid which evenly enlarges the uterus can be distinguished from a pregnancy by the history of irregular or increased menstruation and by the absence of all other signs of pregnancy. In cases of doubt the patient should be kept under observation for a few weeks when the recurrence of the menses or their absence, with the rapid enlargement of the tumor and the development of other signs of pregnancy, will settle the question. In this connection it should be remembered that occasionally a fibroid and a pregnancy are found in the same uterus. In those cases the fibroid does not usually encroach upon the uterine cavity and can be distinguished almost invariably by palpation from the cystic body of the pregnant uterus.

Fibroid polypi may frequently be felt just within the dilated cervival canal or projecting from the external os. They are usually smooth, hard, and round.

Treatment. — In the medical treatment of fibroids, one after another of a long list of remedies have been advocated, used, and abandoned. A few years ago electricity was brought forward as a sovereign cure, but it also has joined the useless group of non-surgical measures. It is true that under the administration of drugs and the application of electricity some patients are apparently relieved;

ut when we recall the facts that the rate of growth of oids is very irregular, that the size one will attain before sing to grow is unascertainable, that the migration of e tumor may cause a change in the symptoms produced, d that fatty degeneration may begin at any time and cause reduction in the size of the tumor, it is easy to understand how a remedy may be credited with a change for the better with which it had nothing to do.

Since we have to rely upon operative measures for any definite results in the treatment of fibroids, the question immediately arises: Shall all fibroids be removed? At the present time the question would be answered by the majority of operators about this way: Any fibroid that is growing rapidly or that is causing hemorrhage, pain, or pressure symptoms should be removed. Conversely any fibroid which is not large enough to interfere materially with other organs by pressure, which is not rapidly enlarging, and which is not causing pain or hemorrhage may safely, for a time at least, be allowed to remain, but must be kept under observation.

In some of the larger tumors which have caused much loss of blood and which will necessitate a radical operation, a curettage is sometimes done as a preparatory measure. The curettage checks for the time the loss of blood and allows the patient to recuperate enough to withstand the major operation. There are some cases of small submucous fibroids which cause hemorrhage and which are best treated by one or more thorough curettements.

Operations for the removal of fibroids are done either through the vagina or through the abdominal wall. By both routes fibroids are removed either by myomectomy or hysterectomy.

Vaginal myomectomy is applicable to the pedunculated submucous fibroids or polypi, to some of the sessile submucous tumors, to a part of the cervical fibroids, and to some of the smaller tumors in the body of the uterus. Many of the smaller polypi can be removed by grasping them with a strong vulsellum and twisting them until the pedicle is broken off. When the pedicle is large and the tumor does not fill up the vagina, it may be drawn down and the pedicle cut through with scissors. If the tumor is so large that the whole vagina is filled, making it difficult or impossible to reach the pedicle, the tumor may be removed piecemeal and the pedicle cut through after the bulk of the tumor is out of the way. There is practically no hemorrhage from the incisions into the tumor and none of importance from the severed pedicle.

A sessile submucous fibroid that is not too large and that can be reached either by dilating or splitting the cervix, can be removed by splitting the capsule and enucleating the tumor as a whole, or it may be removed piecemeal. Tumors of relatively small size growing in the body of the uterus can be removed after the uterus is brought to the outside through an incision in the anterior vaginal wall. The tumors are enucleated, the wound in the uterus closed with catgut, the uterus is returned to its proper position, and the wound in the anterior vaginal wall closed. A *vaginal hysterectomy* is applicable only to the uterus that is studded with small fibroids when myomectomy is not practicable.

The abdominal operation which is done most frequently for uterine fibroids is *supravaginal hysterectomy*. A median abdominal incision is made sufficiently long to allow the tumor to be brought through it. The incision should be carried down close to the symphysis. A clamp is put on the broad and round ligaments of one side and a second clamp catches the broad ligament between the first clamp and the uterus. The upper part of the broad ligament is then cut through. The same procedure is carried out on the other side. An incision only through the peritoneum is carried across the front of the tumor connecting the incisions in the broad ligaments (Fig. 94). This flap of peritoneum on the anterior uterine wall is stripped downward and the bladder is pushed well forward. At the same time the layers of the broad ligaments are separated and the sides of the cervix exposed down close to its vaginal attachment. It is not necessary to pay much attention to the peritoneum posterior to the tumor and uterus. When the sides of the cervix are exposed the uterine arteries are clamped. These clamps are put on at right angles to the axis of the cervix. There is very little danger of injuring the ureter when the clamps are put on in this way. When

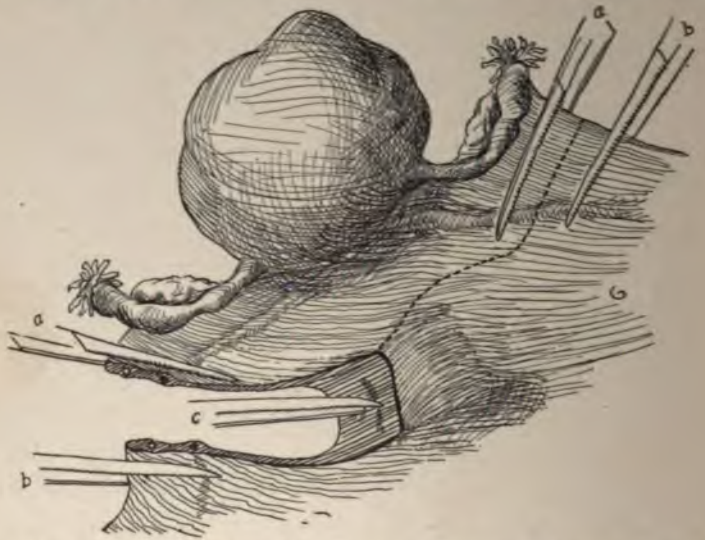


FIG. 94. — SUPRAVAGINAL HYSTERECTOMY. First step. Forceps *a*, *a* clamp the ovarian arteries and the round ligaments on the uterine side of the incision. Forceps, *b*, *b* clamp the ovarian arteries and the round ligaments on the pelvic side of the incision. On the left the broad ligament has been cut through and the clamp *c* is on the uterine artery. The dotted line indicates the line of incision through the broad ligament and through the peritoneum in front of the uterus.

both uterine arteries have been clamped the cervix is cut through just above the clamps and the tumor removed (Fig. 95). The clamped upper border of the broad ligament with the ovarian artery is then ligated on each side. This ligature can usually be made to include also the round ligament. These ligatures are left long temporarily to serve as a guide to the stump of the broad and round ligaments. The uterine arteries are next ligated. All clamps are removed after the ligatures are in place but just before they are drawn tight. A ligature is then passed through the wall of the cervical stump on each side of the canal to control the small vessels in the cervical wall. After this ligature is tied the needle is passed through the stump of the broad and round ligaments on the same side and tied a second time (Fig. 96). This brings the severed ends of the broad and round ligaments and the stump of the cervix in apposition, helps to cover the raw surfaces, restores the

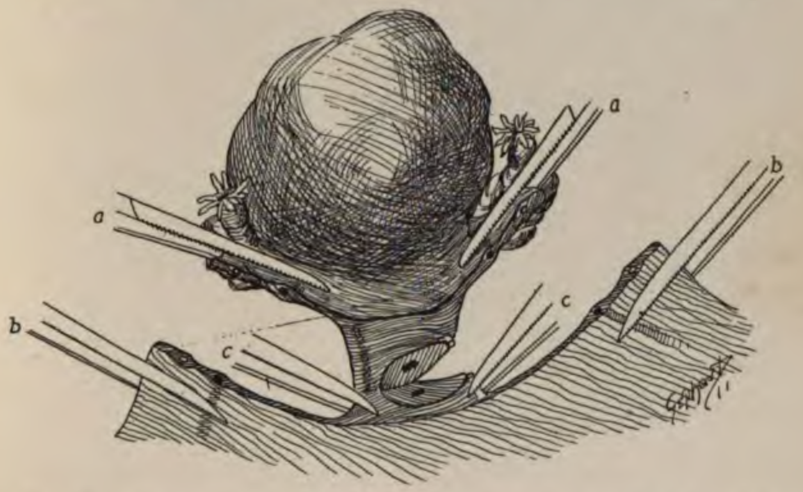


FIG. 95. — SUPRAVAGINAL HYSTERECTOMY. Second step. Both broad ligaments have been cut through both uterine arteries secured by clamps, and the cervix is partially cut through.

port of the vault of the vagina, and prevents prolapse. flap of peritoneum previously dissected from the an- r wall of the tumor is then stitched over the stump the cervix. Any gaps in the broad ligaments are closed nd the floor of the pelvis made as smooth as possible. Unless there is some special indication the abdomen is closed without drainage.

By *abdominal myomectomy* is meant the removal of uterine fibroids through an incision in the abdominal wall without the removal of the uterus. It is applicable to tumors in any location in the uterus when they are not too numerous, and when the uterine wall has not been too much disorganized by their growth. Naturally the pedunculated subperitoneal fibroids are the ones most easily dealt with, but the sessile subperitoneal, interstitial, and submucous may also be removed by this method. From this it would appear that a large portion of fibroids could be removed by myomectomy. As a matter of fact, each case must be judged by itself, and the result is that only a relatively small per cent of them can best be treated in this way. The two

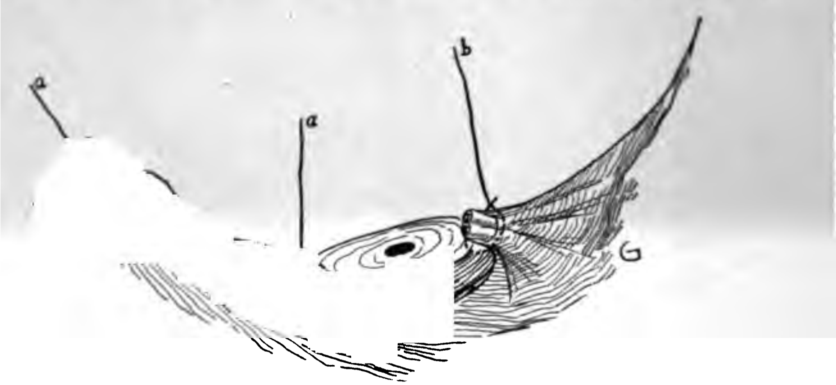


FIG. 96. — SUPRAVAGINAL HYSTERECTOMY. Third step. *a* shows the method of placing a suture to bring the stumps of the round and broad ligaments to the stump of the cervix; *b* shows the corresponding suture tied.

dangers of myomectomy are hemorrhage and sepsis. Of these, sepsis has been responsible for the greatest amount of trouble following this operation. When the operation was first introduced the mortality from sepsis was greater than the mortality after supravaginal hysterectomy, but as operative technique has improved the dangers of sepsis have very much diminished and the field for myomectomy has consequently broadened.

In the removal of pedunculated tumors a cuff of peritoneum is dissected from the pedicle, the pedicle cut through, the stump ligated in sections, and the cuff of peritoneum stitched smoothly over it. In the tumors having no pedicle, an incision parallel to the long axis of the uterus is made directly over the mass. The fibroid is separated from its capsule by blunt dissection and removed (Fig. 97). The wound is closed by one or more tiers of sutures so placed that they will control the hemorrhage and coapt the edges of the wound. These sutures must not be drawn too tightly. Care should be taken to handle the wound as little as possible.

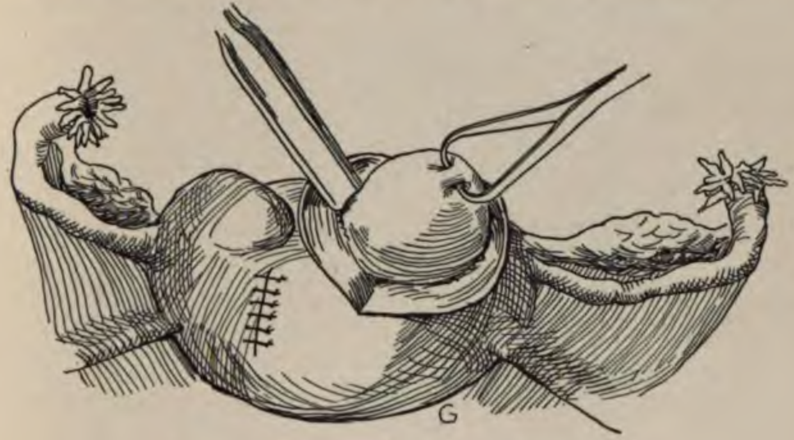


FIG. 97. — MYOMECTOMY.

CHAPTER XV

DISEASES OF THE FALLOPIAN TUBES AND PELVIC CELLULITIS

ANATOMY

The Fallopian tubes are two trumpet-shaped organs about four and a half inches long that are continuous with the superior angles of the uterus. They extend outward from the uterus between the layers of the broad ligament at its upper border. Internally the tubes are narrow and open into the cavity of the uterus. Externally the tubes become wider and terminate in an expanded mouth which opens into the peritoneal cavity. The internal narrow portion of the tubes is called the isthmus; the outer wider part is called the ampulla.

The tubes are made up of four coats, — serous, cellular, muscular, and mucous. The serous coat is the free border of the broad ligament. It is incomplete below where the two laminæ approximate each other. The cellular coat is continuous with the subperitoneal tissue of the broad ligament and is rich in blood-vessels. The muscular coat is about one-sixth of an inch in thickness. It is directly continuous with the muscular wall of the uterus. The mucous membrane has numerous longitudinal folds. Near the uterine end of the tube (Fig. 98) these folds are arranged very simply, but as the outer extremity of the tube is approached the folds become so numerous and complex that a cross section gives the appearance of branching tubular glands in the mucosa (Fig. 99). The folds of mucous membrane projecting from the ends of the tubes terminate irregularly and form the fimbriæ (Fig. 100). The surface of the mucosa is covered with a single layer of columnar epithelium.

SALPINGITIS

The term "salpingitis" includes all the changes that take place in the Fallopian tubes as the result of infection.

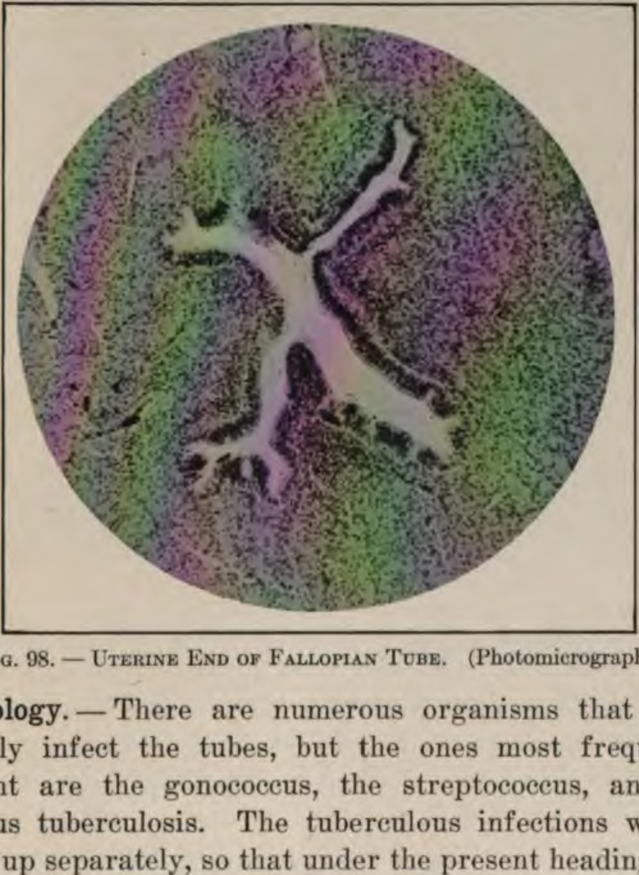


FIG. 98. — UTERINE END OF FALLOPIAN TUBE. (Photomicrograph.)

Etiology. — There are numerous organisms that occasionally infect the tubes, but the ones most frequently present are the gonococcus, the streptococcus, and the bacillus tuberculosis. The tuberculous infections will be taken up separately, so that under the present heading only the changes due to the gonococcus and other pus-producing pinx, interstitial salpingitis, hydrosalpinx, and tubo-ovarian abscess.

In *catarrhal salpingitis* the infection involves only the mucous membrane of the tube, and little or no pus is formed. It may be either the result of infection in its early stages or the result of an infection of low virulence. Some of these cases are seen before there has been enough reaction to close the ends of the tube or to start a peritonitis causing adhesions. There is very little increase in the size of the tubes. On microscopical examination there is seen much small round-cell infiltration and many polynuclear leucocytes in the mucosa. The epithelium is swollen. The blood-vessels of the mucous membrane are congested. There may be slight round-cell infiltration in the wall of the tube.

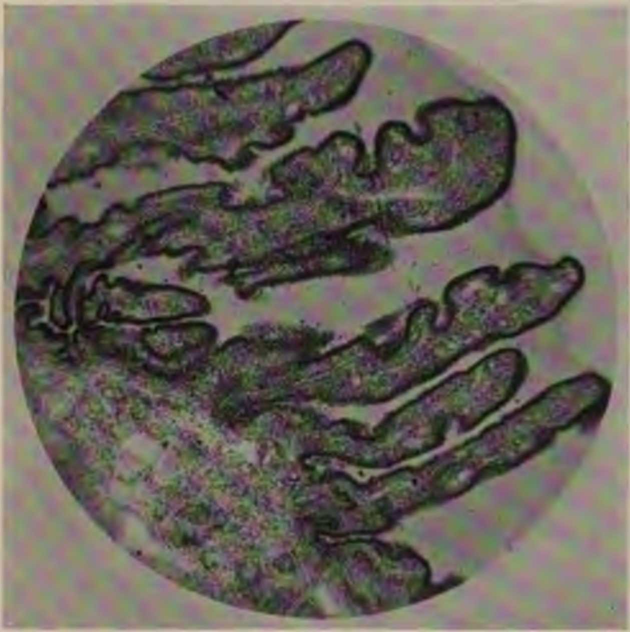


FIG. 100. — FIMBRIATED EXTREMITY OF FALLOPIAN TUBE. (Photomicrograph.)

By *purulent salpingitis* is meant that condition in which there is definite pus formation in the tube but without any great accumulation of pus (Fig. 102). It is a process that is a little farther advanced in its development than the catarrhal form. When the tube becomes widely distended with pus it is called a *pyosalpinx*. When sections of infected tubes are examined microscopically every step in the changes from those seen in mild catarrhal cases to the complete destruction of the mucosa are seen.

In *interstitial salpingitis* the reaction to the infection is more marked in the walls of the tube than in the mucous membrane (Fig. 103). It may be associated with purulent salpingitis, but in some instances the infection seems to involve the walls of the tube primarily. Cases of the latter sort are usually due to a streptococcus infection. In the early stages of this condition the most obvious process is the enormous infiltration of small round cells. In the later processes the walls of the tube become many times thicker than normal from an increase of connective tissue and the lumen becomes narrowed.

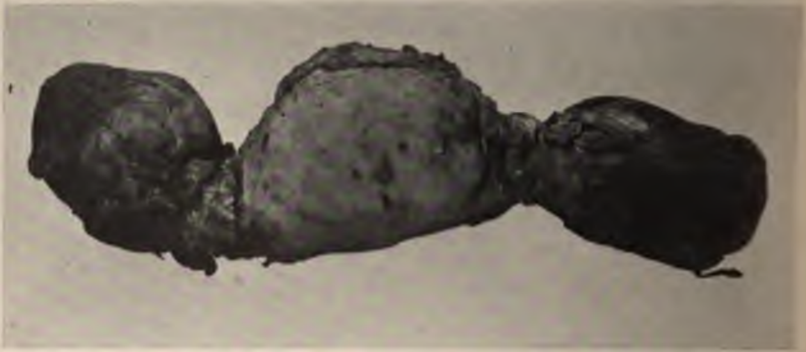


FIG. 101. — SALPINGITIS. This is one of the types of gonorrheal salpingitis.

Hydrosalpinx is a tube that is sealed at both ends and distended with a thin watery fluid. Hydrosalpinx in the beginning is probably due to a mild infection which continues until both ends of the tube are closed but which does not destroy the epithelium of the mucosa. When the inflammatory process has stopped the epithelium continues to secrete, but both ends of the tube being closed there is no avenue for the escape of the secretion, and it gradually distends the tube. The walls of a hydrosalpinx are very thin. Its cavity is lined with epithelium that is somewhat lower than the normal epithelium found in the tube, and here and there a few remains of the folds of the mucous membrane of the tube can be seen (Fig. 105).

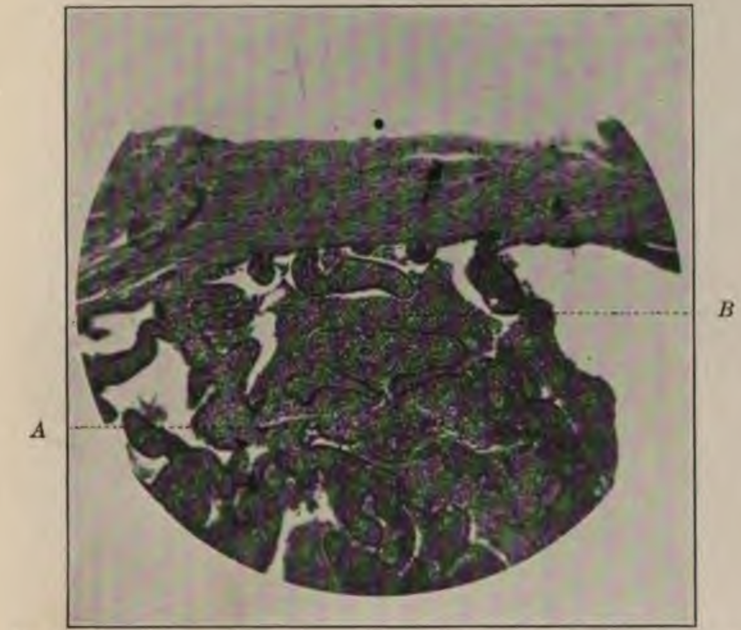


FIG. 102. — PURULENT SALPINGITIS. (Photomicrograph.) Compare the folds in the mucous membrane of the tube with those shown in Fig. 98. Between the folds of the mucous membrane is free pus. *A*, swollen mucosa; *B*, free pus.

A *tubo-ovarian abscess* is the result of direct infection of the ovary from the tube either by way of the fimbriated extremity or directly through the wall of the tube. As its name indicates, it is an abscess cavity the walls of which are made up partly of ovarian tissue and partly of the walls of the tube. They vary greatly in size, some of them forming a mass large enough to fill up the entire pelvis.

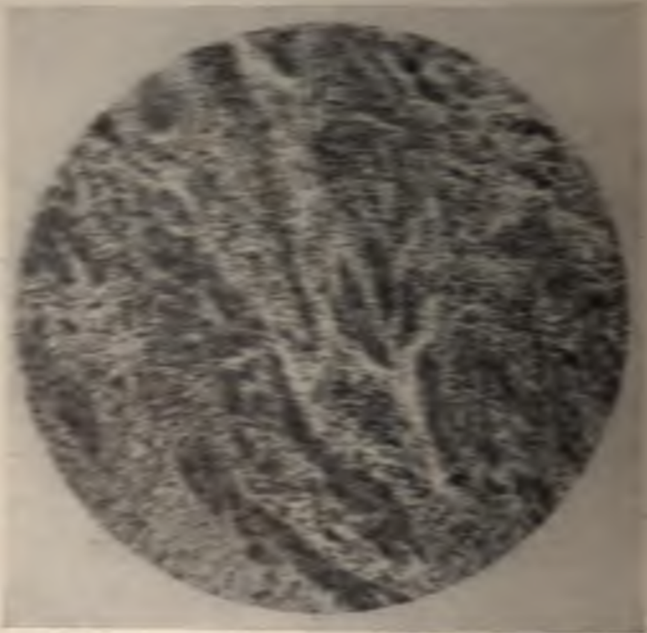


FIG. 102. — INTERSTITIAL SALPINGITIS. (Photomicrograph.) Round-cell infiltration in the muscularis of the tube is shown.

The walls of the abscess are usually very thick and resistant and form a well-defined, rounded mass.

As the result of leakage from the end of the tube before its closure, and also from the extension of the infection through the walls of the tubes to its peritoneal covering, many adhesions are formed between the infected tube and the other pelvic organs. These adhesions vary greatly both in quantity and density. Some are very easily broken up, while others are extremely firm and hard. They fix the and duration. The first menstrual flow that comes on after the tubes have become infected is very commonly characterized by an unusual amount of pain, an unusually free flow of blood and the passing of clots. Sometimes these symptoms are so marked that they are mistaken for the symptoms of a miscarriage. When an infection starting in the tube involves the ovaries and partially or completely destroys them, the result may be a decrease or absence of the menstrual flow.

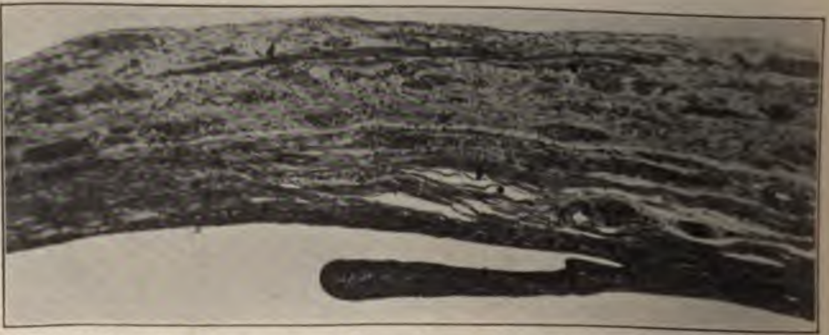


FIG. 105. — HYDROSALPINX. (Photomicrograph.) Only a small segment of the circumference of the tube can be shown. The fragment of one fold of mucous membrane is attached.

There is usually present a leucorrheal discharge due to the associated infection of the endometrium.

In the earlier stages of infection the pulse and temperature are usually both increased, but the temperature as a rule does not run high and the rise continues only a few days. The rise of temperature is most marked in streptococcus infections.

Diagnosis. — The diagnosis is made from the clinical history and results of physical examination. Where the streptococcus is the infecting organism, there is usually a history of labor or miscarriage which is followed by a rise of temperature and pelvic pain. Where the infecting organism is the gonococcus, there will be a history of frequent and burning micturition and a purulent vaginal discharge that had been present at some time previous to the beginning of the symptoms that are associated with the salpingitis.

The physical signs vary with the gross pathological conditions. In the catarrhal form frequently very little can be made out except that the tubes are tender on palpation. When a purulent salpingitis is present, there is such a mass of adhesions about the tube that, unless it is unusually distended, no signs of fluctuation can be made out; but elongated firm masses that are fixed in their position on both sides of the uterus can be felt. These masses are tender on pressure. In the interstitial form the tube forms a hard adherent mass on either side of the uterus. There is nothing very characteristic of hydrosalpinx. It is usually not bound down so firmly by adhesions as those in which the tube has been more severely infected. When movable

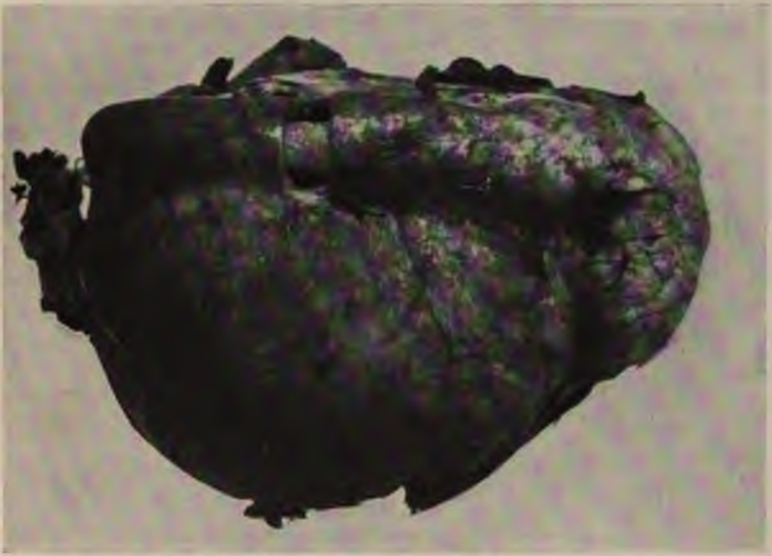


FIG. 106. — TUBO-OVARIAN ABSCESS.

it may be mistaken for a small ovarian cy ovarian abscess can sometimes be distingu definite rounded outlines.

Prognosis. — Many cases of salpingitis recov ously. Many recover ative treatment. In where there is a forma the tendency is to hav attacks of pain and ending in chronic i The actual danger to salpingitis is not ver Occasionally a pyosalp rupture, causing a gene tonitis and resulting in t of the patient, but excep puerperal infections, th dent is extremely rare.

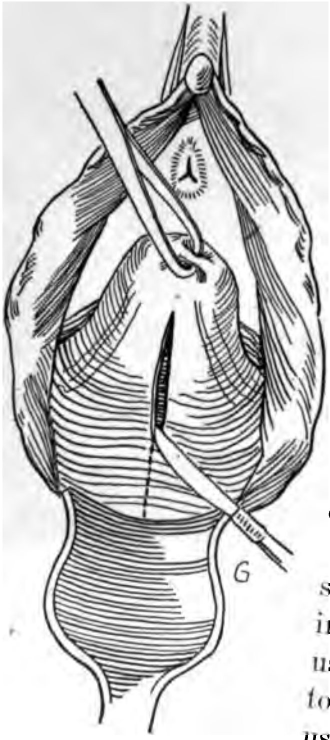


FIG. 107. — POSTERIOR VAGINAL SECTION. First step. The line of incision is indicated.

Treatment. — During th stage the patient should b in bed. Hot vaginal douch useful. To obtain any sa tory results the quantity of used should be large and the perature of the water as hig can be borne with comfor the patient. The douches sh be given with the patient in the recumbent position the hips elevated. Glycerin tampons placed in the vag at night and removed each morning relieve the pain reducing the pelvic congestion and promote drainage fr the uterus. The bowels should be kept active by the use salines. The most efficient of the salines for this purpo is the sulphate of magnesium. It is given preferably

When a large quantity of pus is collected, especially when due to a streptococcus infection, it is much safer to *drain* the pus cavities through the *posterior vaginal wall* than it is to open the abdomen. A speculum is inserted into the vagina and the perineum retracted. The posterior lip of the cervix is caught with bullet forceps and drawn upward. A long incision is made in the median line of the posterior vaginal wall beginning immediately behind the cervix and carried downward and forward for at least two inches (Fig. 107). This first incision goes only through the vaginal wall. The rectum can be avoided when extending the incision downward by pulling the vaginal wall forward. From this point by blunt dissection the pus sac is exposed. A long retractor can now be inserted directly into the wound in the posterior vaginal wall and the pus sac can be opened with a knife directly under the eye of the operator (Fig. 108). The opening in the sac is stretched by inserting a pair of heavy closed forceps into the incision and then withdrawing them after they are opened. The pus is allowed to drain out, but the cavity is not irrigated. A piece of gauze a yard wide and long enough to fill up the cavity loosely is inserted as a drain.

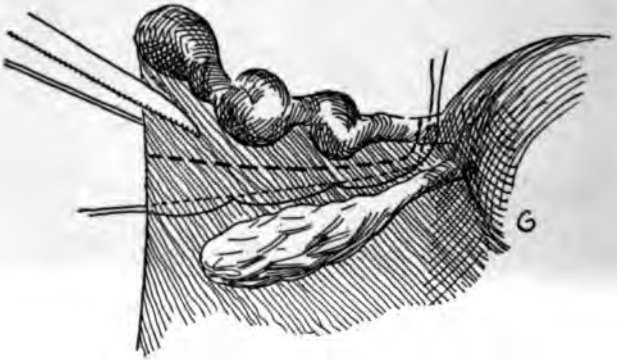


FIG. 109. — REMOVAL OF INFECTED TUBE.

The patient is placed in a sitting posture immediately after the operation, either in bed or in a chair. At the end of forty-eight hours a few inches of the gauze drain is pulled down and cut off. Thereafter a short section of the drain is removed every forty-eight hours until the whole is removed on the eighth day. The two points of particular importance in this operation are the large opening in the posterior vaginal wall and the large drain. The cases, which are not permanently relieved by posterior vaginal drainage, are in a very much better condition for a radical abdominal operation than they would have been without the drainage.

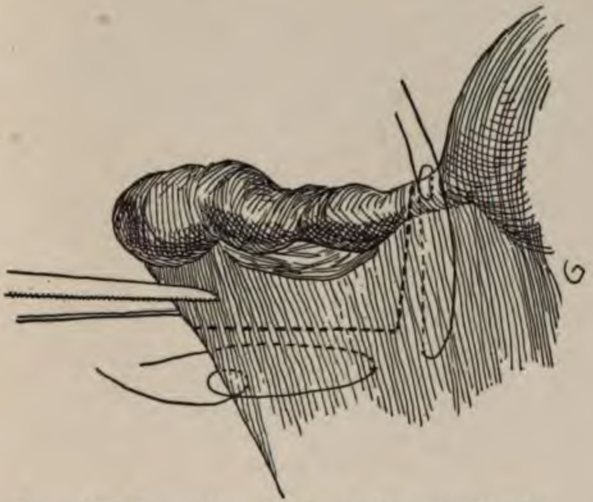


FIG. 110. — REMOVAL OF INFECTED TUBE AND OVARY.

When *operating through the abdominal wall* for salpingitis the patient is put in the Trendelenburg position. The abdomen is opened near the median line between the symphysis and umbilicus. The intestines are packed away from the field of operation by gauze pads. This packing off of the intestines serves two purposes: first, it protects the contents of the abdomen from infection; second, it keeps the intestines from being exposed to the atmosphere.

In the cases of *catarrhal salpingitis* there are usually few or no adhesions and no involvement of the ovaries, so that in these cases it is necessary to remove only the tubes. The mesosalpinx and the uterine end of the tube are clamped and the tube cut away. The mesosalpinx including the severed end of the tube are tied off in sections. If the inflammation is due to any micro-organism except the gonococcus it may be necessary to remove only one tube, but if it is due to a gonococcus infection both tubes should be removed.

In the cases of *purulent salpingitis*, *pyosalpinx*, or *interstitial salpingitis*, after the abdomen is opened and the intestines packed off, it is necessary to break up the adhesions that bind the tubes and ovaries to the pelvic walls and pelvic viscera. This is best done by inserting the finger, with the palm side forward behind the body of the uterus. After freeing the posterior uterine wall the lines of cleavage ordinarily can be followed to both sides, freeing the tubes and ovaries from their posterior adhesions. No attempt should be made to bring up either tube until the adhesions on both sides are broken up. In a great many cases both ovaries are so badly disorganized that it is necessary to remove them together with the tubes.

In all cases, and especially in women under thirty-five, where it is possible, at least a portion of one or both ovaries should be allowed to remain. When a *tube and ovary together* are to be removed the broad ligament is clamped just beyond the end of the tube, and the second clamp is put on the broad ligament including the tube close to the uterus. These two clamps control the blood supply. By cutting out a V-shaped piece of the ligament tween the clamps, the tube and ovary are removed. The mps are replaced by ligatures. By tying the ends of these ligatures together the notch in the broad ligament is closed.

In those cases in which the ovaries are destroyed and in which there is an endometritis and a metritis with an enlargement of the uterus associated with the tubal infection, the best results are obtained by *supravaginal hysterectomy*. After separating the adhesions in most instances the operation is identical with that of supravaginal hysterectomy for fibroids. In some instances it is not possible to break up the adhesions on one side from above. When that is the case the uterine and ovarian arteries on the side where the adhesions can be separated are clamped and cut through. An incision is made through the cervix, the uterine artery on the side of the dense adhesions is clamped, and the adhesions are separated from below upward. In rare instances it is necessary to split the uterus from the fundus down to the cervix, cut through the cervix on either side, and secure the uterine arteries. Then separate the adhe-

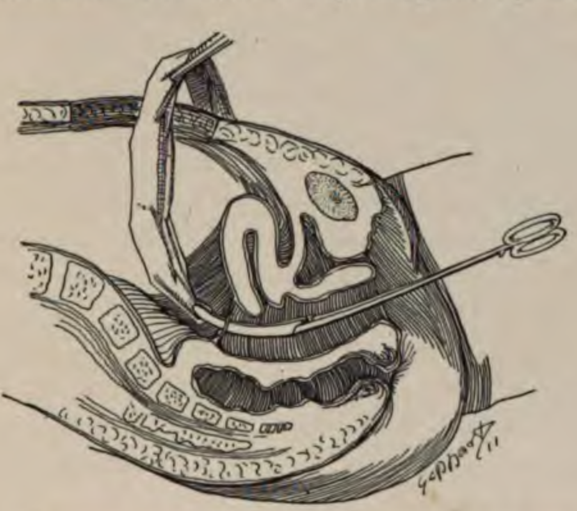


FIG. 111. — POSTERIOR VAGINAL DRAIN. The method of introducing a gauze drain from the abdominal wound out through the posterior vaginal wall is shown.

sions from below upward on both sides. Before the stump of the cervix is covered with the peritoneal flap the cervical mucous membrane should be burned out with a cautery.

The pus due to a long-standing gonorrheal infection is nearly always sterile. Pus due to a streptococcus infection is usually not sterile. In any case where there is any question as to the sterility of the pus present, a *drain* should be put in. The most favorable position for a drain is through the posterior vaginal wall. An assistant introduces a long curved forceps through the vagina and pushes up the posterior fornix as far as possible. An incision is made down on the point of the forceps and the forceps are pushed into the cavity of the pelvis. The opening in the posterior vaginal wall can be enlarged by forcibly opening the forceps while they are in this position. A large gauze drain is introduced through the abdominal wound, grasped by the forceps, and drawn down until the end projects well into the vagina (Fig. 111). The lower portion of this drain which extends through the vaginal wound should be covered by rubber protective tissue. Enough of the drain is folded into the pelvic cavity to fill it loosely and the remainder is cut off. The sigmoid and omentum are drawn over the drain. The abdominal wound is completely closed.

All patients operated upon for salpingitis should be put in the upright position immediately after operation whether they are drained or not.

TUBERCULOUS SALPINGITIS

The bacillus tuberculosis invades the tubes relatively frequently. The infection reaches the tubes by direct continuity of tissue either from the uterus or from the peritoneum. It may be conveyed there by the blood current from distant foci, or may be carried from other points in the genital tract by the lymphatics. The infection may go directly to the tubes from below without infecting the vulva, vagina, or uterus. It may occur at any age, but the majority of cases are seen before the patient is thirty years of age. Nearly all cases of salpingitis occurring in virgins are tuberculous.

Pathology. — There is a very great variety in the gross appearance of tubes affected with tuberculosis. The tube is sometimes so slightly enlarged or so closely resembles the ordinary catarrhal salpingitis, that tuberculosis is not suspected. There is a tendency to the formation of irregularly sized enlargements in the tube. The end of the tube in long-standing cases is closed and the cavity may be distended with serous or bloody fluid or pus. In some of the mixed infections it is not possible to recognize the tuberculous element by the gross appearance. Usually tubercles can be seen studding the outer side of the tube. More or less tuberculous peritonitis as a rule is associated with the

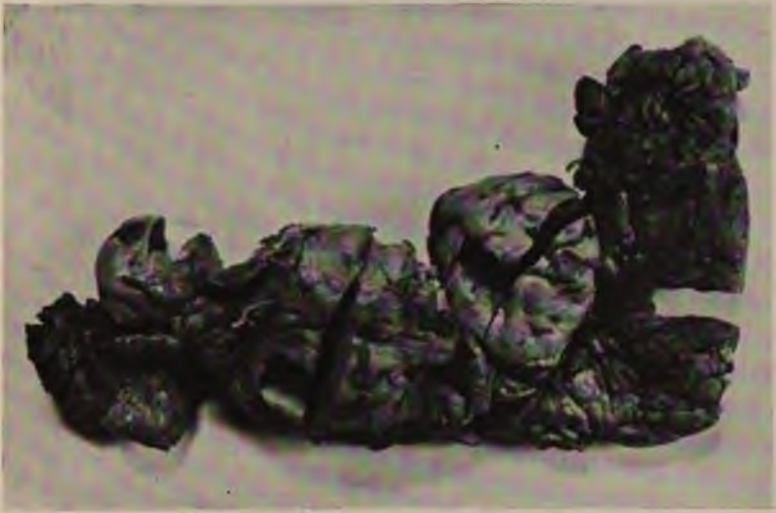


FIG. 112. — TUBERCULOUS SALPINGITIS.

tubal infection. This peritonitis may be limited to an area very close to the tube, or it may spread to a great extent throughout the abdominal peritoneum. There may be an aggregation of tubercles which undergo caseous degeneration. In some instances the lumen of the tube will be distended with caseous material. Microscopical examination shows giant cells and small caseous areas in the mucosa of the tube. There is much small round-cell infiltration beyond these caseous areas (Fig. 113). The wall of the tube usually shows only round-cell infiltration.

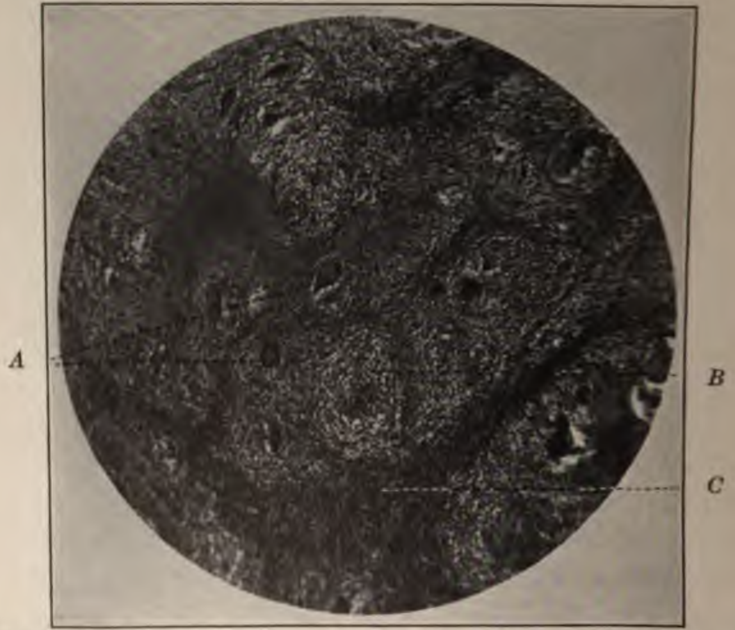


FIG. 113. — TUBERCULOUS SALPINGITIS. (Photomicrograph.) *A*, giant cells; *B*, caseous area; *C*, area of small round-cell infiltration.

Symptoms. — There are no distinguishing symptoms of tuberculous infection of the tube. In cases of long-standing salpingitis in virgins, or when there are tubercular infections present, tuberculosis may be suspected.

Diagnosis. — Usually the diagnosis of tuberculosis salpingitis is not made until after the abdomen is opened. In many instances it is not made until sections of the tubes are examined microscopically.

Prognosis. — The prognosis depends very largely upon whether the tuberculous infection is distributed to other portions of the body. Where the infection is limited to the tubes and to the peritoneum immediately surrounding them and the uterus, the prognosis is good.

Treatment. — The tubes should be removed by abdominal section. If the uterus is involved, hysterectomy should be done. The involvement of the peritoneum is no contraindication for operation.

TUMORS OF THE FALLOPIAN TUBES

Fibromyoma. — Fibromyomata developing from the muscular layer of the Fallopian tube occasionally occur. They are usually of very small size and have little clinical significance.

Papilloma. — Papillomata of the tube sometimes grow to the size of an orange. They have a tendency to take on malignant changes. When the end of the tube remains open the secretion from the papillomata accumulates in the peritoneal cavity producing ascites.

Carcinoma. — A carcinoma in very rare instances develops from the epithelium lining the mucous membrane of the tube. Secondary carcinoma may be an extension from the ovary or some of the other adjacent viscera. The tube is very rarely involved in carcinoma of the uterus.

Sarcoma. — Sarcoma of the tube is rarely met with.

PELVIC CELLULITIS

Pelvic cellulitis or parametritis is an infection of the loose connective tissue lying between the peritoneal folds that make up the ligaments of the uterus. The infecting micro-organism is nearly always the streptococcus. It usually follows a labor or a miscarriage. The organisms enter the tissues through the placental site or through abrasions in the cervix, vagina, or perineum. They reach the deeper structures in the pelvis by way of the lymph vessels and veins. The infection tends to localize itself in one place. This is most frequently in the base of the broad ligament. Sometimes the principal point of infection will be in the utero-sacral or utero-vesical ligaments. There is always a certain amount of associated pelvic peritonitis. There is a very great amount of exudate which forms a hard resistant mass in the pelvis. This may undergo resolution or may break down with the formation of pus. These accumulations of pus have a tendency to follow the lines of the loose connective tissue and ultimately to break into the rectum, vagina, bladder, or through the abdominal wall. After the rupture the pus cavity may drain completely and heal up. In other instances there may be a fistulous tract formed that will remain patulous for a long time.

Symptoms. — The first symptom observed ordinarily is a severe chill followed by a rise of temperature. As soon as there is much tension developed in the pelvis, pain is produced. This pain is often quite severe in character. If the exudate is in such a position as to cause direct pressure upon the rectum or bladder, there will be painful defecation and pain on urination.

Diagnosis. — On physical examination a hard mass is felt usually on one side of the uterus. In exceptional cases both sides may be involved. The uterus is firmly fixed in its position. Even when there are considerable quantities of pus present the amount of exudate, surrounding the fluid, is so great that fluctuation as a rule cannot be detected. These physical signs taken in connection with the sudden onset during the puerperium is usually sufficient for making a diagnosis.

Treatment. — In the early stage of the disease the patient should be kept in bed. Sulphate of magnesia should be given in sufficient quantities to keep the bowels loose. Hot applications over the lower portion of the abdomen and hot vaginal douches give some relief. When the pain is excessive, morphia should be given in sufficient doses to mitigate it. When there is a formation of pus, the majority are best drained through an incision in the median line of the posterior vaginal wall. In exceptional cases it is necessary to make an opening between the uterus and the bladder to reach the pus. Occasionally the abscess points in the neighborhood of Poupart's ligament and is best opened through the abdominal wall. Wherever the opening is made it should be wide and the pus cavity should be packed loosely with sterile gauze. This gauze is gradually removed. The incision must be kept open until there is healing from the bottom of the abscess cavity.

CHAPTER XVI

EXTRAUTERINE PREGNANCY

"Ectopic gestation" and "tubal pregnancy" are used synonymously with extrauterine pregnancy. Extrauterine pregnancy means, as its name indicates, the development of an impregnated ovum anywhere outside of the uterus. Extrauterine pregnancies occur much more frequently than is generally believed. Very few of them give rise to the train of severe symptoms that is generally recognized as indicating a ruptured tubal pregnancy. There are undoubtedly large numbers of cases that recover without ever being discovered. A uterine and a tubal pregnancy occasionally occur together, as do also multiple tubal pregnancies.

Etiology. — Extrauterine pregnancy occurs most frequently in patients who have a relative sterility. The direct cause in most instances is probably some obstruction of the calibre of the tube that is due either to a congenital defect or that has resulted from an infection. In most instances it is impossible to determine the definite cause which prevented the ovum from passing through the tube to the uterus.

Pathology. — The uterus is usually slightly enlarged, but it never approaches the size it would be at the corresponding period of uterine pregnancy. On bimanual examination the uterus never feels cystic as it does in a uterine pregnancy. The endometrium is somewhat thickened and has the general characteristics of a premenstrual endometrium, the only difference being that the changes which occur in the endometrium just before menstruation are exaggerated in extrauterine pregnancy. The glands are more widely distended and the stroma cells approach more nearly the true decidual type than they do in the premenstrual endometrium. In the tube the muscular fibers are increased in size and the calibre of the blood-vessels is enormously increased. Chorionic villi are found in the lumen of the tube and decidual cells in the tube wall.

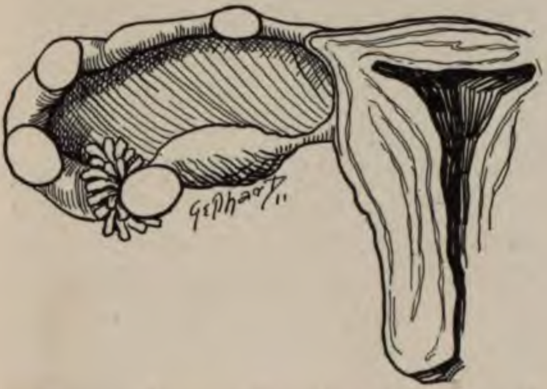


FIG. 114. — DIAGRAM SHOWING VARIOUS LOCATIONS OF EXTRAUTERINE PREGNANCY IN THE TUBE.

Practically all extrauterine pregnancies are originally tubal. Very rarely an ovarian pregnancy occurs. The ovum starts to develop either in the isthmus or the ampulla of the tube. As the ovum develops, the tension in the tube is increased and the chorionic villi pushing into the wall of the tube from the ovum erode and weaken it. These two processes, the increasing tension and the erosion, finally cause the tube to rupture. The direction of the rupture is fixed by the point at which the greatest amount of erosion has taken place.

If the ovum has lodged in the isthmus of the tube, the rupture may take place either upward into the peritoneal cavity or downward into the broad ligament. If the amniotic sac is broken at the time of a rupture downward, the death of the fetus follows and the fetus can seldom be found. The only result of the rupture is the formation of a hematoma in the broad ligament. If the amniotic sac is not broken the fetus may continue to develop between the layers of the broad ligament.

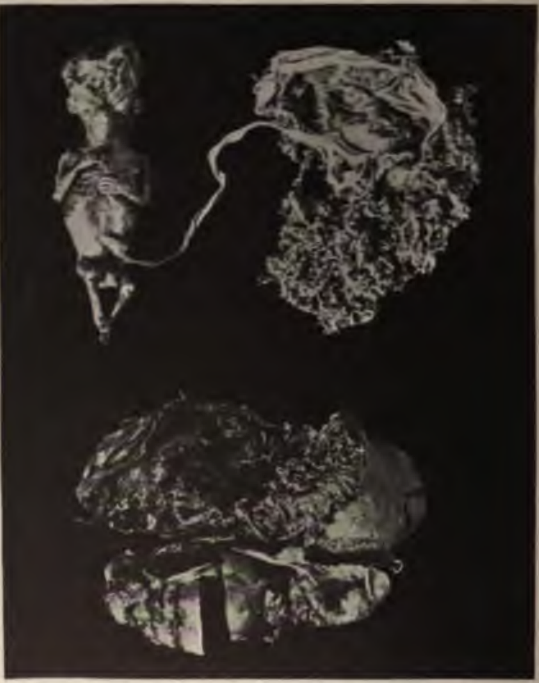


FIG. 115. — EXTRAUTERINE PREGNANCY. Ruptured tube, fetus, and early placenta.

When the rupture takes place into the *peritoneal cavity* there is, exceptionally, an immediate profuse hemorrhage into the abdomen. Usually, however, the hemorrhage is only moderate in amount, and the irritation of the peritoneum by the free blood causes sufficient plastic exudate to partially or completely encapsulate it. Secondary ruptures usually occur and the process of encapsulation is repeated.

What is known as a *tubal abortion* is the partial or complete escape of the ovum from the fimbriated extremity of the tube. When an unbroken amniotic sac escapes into the abdomen, either through a rupture in the tube or from the fimbriated extremity, the fetus may continue to develop as an abdominal pregnancy. An abdominal pregnancy may go to full term. The placenta attaches itself to the broad ligament, or to the walls of the pelvis, or partially to any of the pelvic viscera.

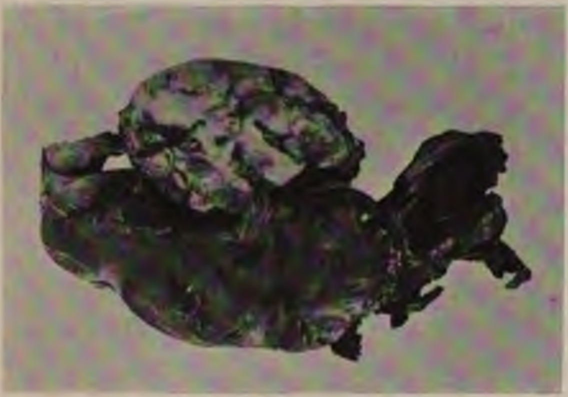


FIG. 116. — TUBAL ABORTION.

When the death of the fetus occurs during an early period of its development it is usually promptly absorbed along with the blood that is in the peritoneal cavity. If the ovum has continued to develop for several months before the death of the fetus occurs, several processes may result. The fetus may become mummified or lime salts may become deposited in it. This latter is the so-called lithopedian. Either of these two forms may remain in the abdomen for years without giving rise to very much trouble. In other instances infection takes place resulting in an abscess. The infection may occur very soon after the death of the fetus or it may be delayed for months or years. The abscess may rupture either through the abdominal wall or into the intestine with the extrusion of fetal remains through the opening.

When the gestation extends to full term there may be a spurious labor, after which the death of the fetus usually occurs. When the fetus dies, the circulation in the placenta ceases.

Symptoms. — The symptoms produced by an extrauterine pregnancy up to the time of rupture or tubal abortion differ very little from those associated with normal pregnancy. The most common time for the rupture to take place is during the first week of the second month of the pregnancy. In a few cases the rupture occurs before the first month of pregnancy is complete, and some ruptures are delayed until after the second month. The immediate symptoms produced by the rupture are modified by the direction of the rupture and the amount of blood poured out.

When the *rupture* takes place into the *peritoneal cavity* and when there is an immediate loss of a large quantity of blood there is at once a sharp, severe pain and acute anemia; the heart is rapid and weak; the respiration is sighing; the skin is cold and covered with beads of perspiration; and the patient frequently loses consciousness. Excepting the pain, these symptoms are the same as those of any other sudden large internal hemorrhage. Fortunately comparatively few cases have these severe hemorrhages at the first rupture.

In the vast majority of cases the primary rupture is either a minor rupture into the peritoneal cavity with slight hemorrhage or a rupture into the *broad ligament,* or there is an incomplete *tubal abortion.* The symptoms in these cases are frequently so slight that the cause of them is entirely overlooked. Usually there is at first a very considerable amount of pain, a very moderate amount of shock or none, and blood begins to dribble from the uterus. The pain may pass off entirely for some days and then recur from time to time as fresh hemorrhages take place. A small continuous flow of blood from the uterus is very persistent. The amount of blood coming away is never very large, but the continuity of the flow is one of the most characteristic symptoms of extrauterine pregnancy.

Diagnosis. — The most important thing in the diagnosis of extrauterine pregnancy is the menstrual history. It is necessary to learn, if possible, the exact dates of the menstrual periods for the two or three periods previous to the onset of the symptoms. Almost invariably it will be found that the interval between two of these periods has been longer than normal. In a large percentage of cases the patient will have gone over her regular time only a few days. This history of the missed menstrual period, the recurrence of the bleeding associated with an amount of pain greater than the pain ordinarily experienced with menstruation, and the fact that the dribble of blood continues far beyond the time of an ordinary menstruation are very significant of extrauterine pregnancy.

Usually on bimanual examination the uterus is found slightly enlarged and firm, and a boggy mass can be palpated on one side of the uterus. When the hemorrhage is directed into the broad ligament this mass has a clearly defined upper border. The size of the mass may vary anywhere from a slightly enlarged tube to a tumor that fills up the pelvis and the lower abdomen as high as the umbilicus. On vaginal examination there is extreme tenderness over the mass. This tenderness to pressure is very much more marked than it is in any other pelvic condition.

In the exceptional cases where there is a sudden large hemorrhage into the abdomen the diagnosis can usually be made on the history of a missed menstrual period and the indications of internal hemorrhage. In some of these cases if examined immediately after the rupture has taken place and before the blood has had time to coagulate, nothing abnormal can be felt. In the majority of them an indefinite boggy mass can be felt in the pelvis.

Treatment.—The treatment of rupture of an extrauterine pregnancy with severe hemorrhage into the abdominal cavity is essentially the same as that of any other severe internal hemorrhage. The indication for the treatment is the hemorrhage. The hemorrhage can be controlled only by opening the abdomen and tying off the bleeding vessels. Ordinarily the tube is removed. When the indications are that the hemorrhage is progressing, the operation should be done at the earliest possible moment. In those cases in which the indications are that the hemorrhage has already ceased it is best to wait until the patient has somewhat recovered from the shock of the rupture before proceeding with the operation. This differentiation as to whether the hemorrhage has ceased or not is frequently very difficult to make and, in cases of doubt, it is best to proceed with the operation.

In the vast majority of cases the condition is not an emergency one, and while it is essential that these patients should have the source of danger removed, both the local and the general condition of the patient justify taking sufficient time to get the patient into the best surroundings for safe operation. There is usually no difficulty in determining beforehand which tube is ruptured, and in operating, the ruptured tube should be brought up and tied off immediately. After the source of hemorrhage has been stopped the larger blood clots should be removed from

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Large pelvic hematoceles, and especially those that have become infected, should be opened and drained through the posterior vaginal wall. When the drainage operation is undertaken, preparation should always be made for doing an abdominal operation if it should become necessary to open the abdomen to control the hemorrhage.

If an extrauterine pregnancy continues to develop until after the formation of the placenta, as long as the fetus is living it is extremely dangerous to attempt its removal. The danger consists in the inability in many cases to control the hemorrhage from the site of the partially or completely separated placenta. When the placenta is adherent only to the uterus and broad ligaments, the blood supply to it can be controlled; but if it is adherent to the intestines or pelvic wall, it is impossible to control the blood supply. The most satisfactory way to deal with the cases in which the fetus is living after the fourth month is to open the amniotic sac in the least vascular portion, remove the fetus, stitch the edges of the wound in the amniotic sac to the edges of the wound in the abdominal wall, and pack the cavity with sterile gauze.

After the death of the fetus and the cessation of the circulation in the placenta, both can usually be removed with comparative ease and safety.

CHAPTER XVII

DISEASES OF THE OVARIES

ANATOMY

The ovaries are two almond-shaped bodies that vary greatly in size. In young women they are about one inch and a quarter long by three-quarters of an inch wide. Later in life they usually decrease in size and become irregular in outline. The surface of the ovary is yellowish white. It is covered by a layer of cells that are the continuation of the endothelial cells of the posterior layer of the broad ligament. These cells are, however, so modified in their appearance as not to be recognizable as endothelial cells.

The outer portion or *cortex* of the ovary is made up of firm connective tissue and has imbedded in it many immature Graafian follicles (Fig. 117). The number of these Graafian follicles varies with the age of the woman. In young women they are very numerous. Estimates have been made varying from thirty thousand to two hundred thousand. As the woman advances in years the number of Graafian follicles decreases rapidly. In a partially developed Graafian follicle the epithelial lining and the group of cells called the discus proligerus containing the ovum is clearly seen. A *corpus luteum* develops in the process of repair after the rupture of a matured Graafian follicle (Fig. 118). The so-called lutein cells present all the characteristics of new connective tissue cells, and later contract forming a mass of scar tissue called a *corpus albicans.* The central portion of the ovary is made up of connective tissue and has numerous blood-vessels. The portion of the ovary which is contiguous to the broad ligament is called the hilum.

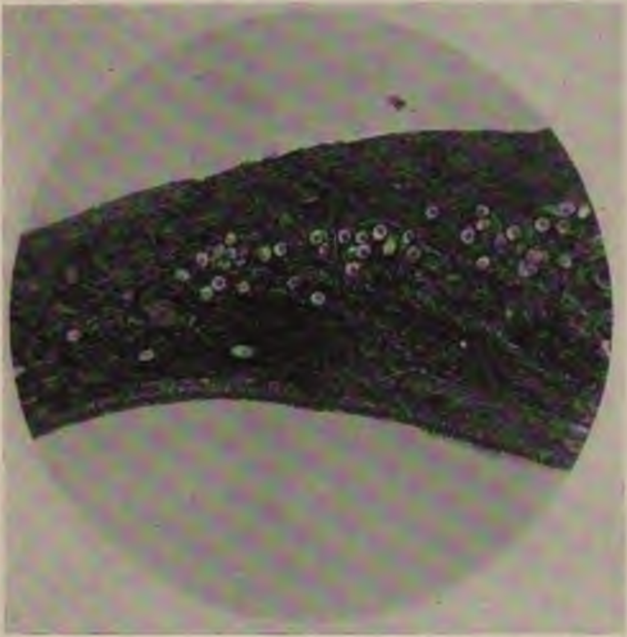

FIG. 117. — CORTEX OF A NORMAL OVARY. (Photomicrograph.) Many immature Graafian follicles are seen imbedded in dense connective tissue. The concave side of the picture is a segment of the wall of a Graafian follicle cyst.

The ovaries are situated one on either side of the uterus just below the Fallopian tubes and posterior to the broad ligaments. The ovary is kept in its position by its attachment to the broad ligament and by the utero-ovarian ligament. The anterior layer of the broad ligament passes down in front of the ovary. The posterior layer of the broad ligament in a modified form spreads out over the surface of the ovary. The utero-ovarian ligament is made up of muscular and fibrous tissue and extends between the layers of the broad ligament from the side of the uterus just below the Fallopian tube to the uterine end of the ovary. One of the fimbriæ from the Fallopian tube is attached to the ovary. The blood-vessels, nerves, and lymphatics enter the ovary through the hilum.

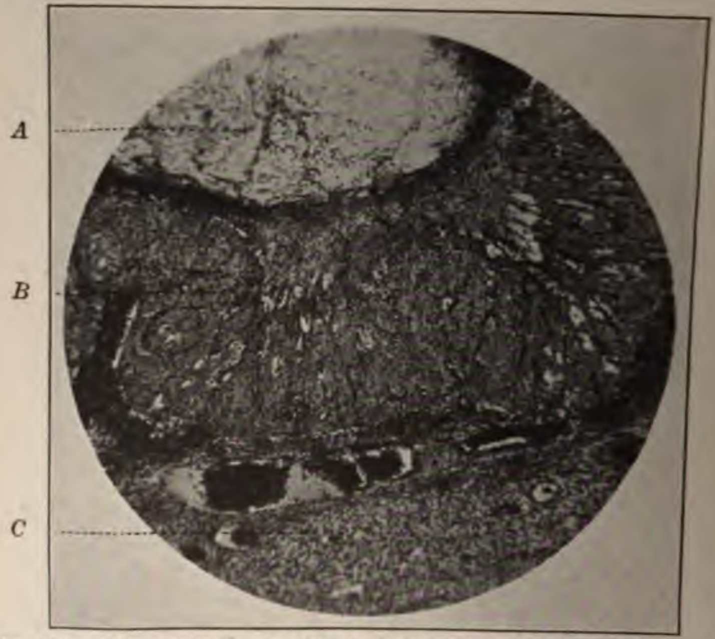

FIG. 118. — CORPUS LUTEUM. (Photomicrograph.) *A*, blood clot; *B*, the new connective tissue or lutein cells; *C*, ovarian stroma.

PERIOÖPHORITIS

In perioöphoritis the surface of the ovary becomes infected from an infection of the pelvic peritoneum. Adhesions are formed which bind the ovary down to a fixed position, and these adhesions are responsible for many of the changes in the ovary itself. Under the conditions present the Graafian follicles are not able to develop and rupture in the normal manner. As a result, numerous small cysts form in the ovary. The increased pressure causes an atrophy of the cortical substance. Many of the so-called cystic ovaries develop in this way.

OÖPHORITIS

Infections of the ovary in nearly all instances are associated with tubal infections (Fig. 119). In exceptional cases the ovary becomes infected through the lymphatics from some other source than the tubes. It is very exceptional for the ovary to be infected except in cases of mumps, without other pelvic infections that entirely mask the ovarian condition. For this reason acute oöphoritis as a disease is of very little clinical importance.

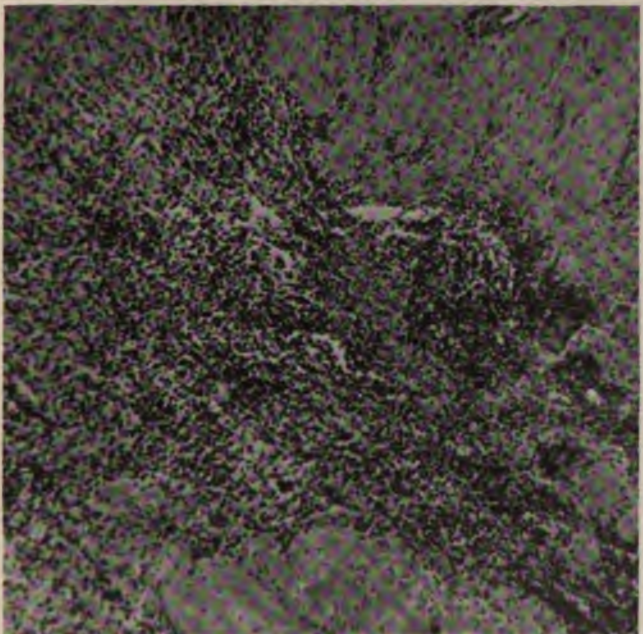

FIG. 119. — INFECTED OVARY. (Photomicrograph.) The stroma of the ovary is infiltrated with numerous small round cells.

of the patient are made at considerable intervals it may be found that the size of the ovary has changed very materially between two examinations.

Treatment. — Both local and constitutional medical treatment in these cases are generally useless. Relief is to be had only by resorting to some surgical measure. In these cases the route of approach is usually abdominal. In many instances the cysts can be either simply punctured or enucleated. In the majority of cases the most satisfactory procedure is a resection of the ovary. A wedge-shaped piece including the diseased portion of the ovary is taken out, leaving behind as much as possible of the normal ovarian tissue. The wound in the ovary is then brought together by an over-and-over fine catgut suture. There is usually no hemorrhage of any moment. In a few cases it is advisable to remove the ovary. This should not be done so long as there is any ovarian tissue of value left.

HEMATOMA OF THE OVARY

In hematoma of the ovary there is a collection of blood in one or more Graafian follicles. These hematomata vary in size from small accumulations of blood to as much as two ounces. The smaller ones are much more common.

Symptoms. — The symptoms that a hematoma of the ovary gives rise to are very similar to those found associated with cystic ovaries, except that the symptoms due to hematoma are usually more severe.

Diagnosis. — The diagnosis can sometimes be made by the excessive tenderness of the ovary.

Treatment. — The portion of the ovary in which the hematoma is found should be resected.

Symptoms. — Pain in the pelvis is one of the most constant complaints. It may be referred to one or both sides of the pelvis. It frequently radiates down one or both legs and is invariably increased by the patient's being much on her feet. There is pain in the region of the sacrum which radiates upward and is associated with severe occipital headache. The occipital headache is paroxysmal and is exaggerated at the menstrual period.

A very characteristic symptom is a severe paroxysmal pain in the pelvis occurring between the menstrual periods. This pain comes on from two to fourteen days before or after menstruation, varying in different cases, but its period of recurrence in each case is very constant. It is severe in character and continues only for a few hours.

Dysmenorrhea is usually present. Pain, as a rule, begins several days before the flow, continues through the period and for a few days after the flow has ceased.

The nervous symptoms from which many of these patients suffer are of such a character that the patients are not infrequently classed as hysterical or neurasthenic. It is very common for them to be easily excited and irritated, to cry without provocation, laugh immoderately, and to be in a generally unstable nervous condition. Occasionally convulsions occur. The convulsions have a tendency to return at the menstrual period.

Nausea is sometimes complained of. It is increased by the patient's being in the erect position. Painful coition is frequently complained of. Painful defecation is also common. In some cases the pain comes on during the act of defecation, and with some the pain comes just after the bowel is emptied and continues for some minutes.

Diagnosis. — The diagnosis is usually made without difficulty. The prolapsed ovary can be felt in the cul-de-sac directly behind the uterus, or can be caught between the fingers in the vagina and the lateral pelvic wall. It can be recognized by its tenderness on slight pressure, by its shape, and by its tendency to slip away from the examining finger.

Treatment. — The treatment is operative. When the ovaries are enlarged, either from hypertrophy or from cystic degeneration, they should be resected to decrease their weight. The elongated ovarian ligament is then shortened by a couple of fine silk or chromic catgut stitches. The first stitch takes a light firm hold in the uterus near the lower border of the ovarian ligament. It is then continued through a portion of the ligament and inserted firmly into the ligament near the ovary. The second stitch is placed in the same way but nearer to and parallel with the upper border of the ligament. When these stitches are tied the ovary is brought close up to the uterus, but it retains a limited mobility independent of the uterus and a complete mobility with the uterus (Fig. 120). If the prolapsed ovaries have been associated with a retrodisplacement, after the ovaries are fixed to the uterus the operator can proceed to do the operation of choice for the correction of the displaced uterus.

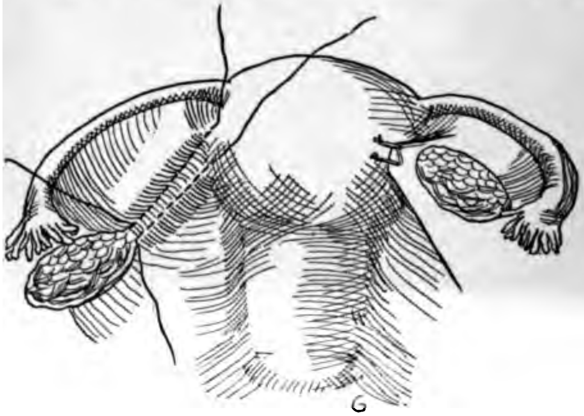

FIG. 120. — OPERATION FOR PROLAPSED OVARY.

CHAPTER XVIII

OVARIAN CYSTS

From the clinical standpoint a satisfactory method of classifying ovarian cysts is to divide them into four groups, — unilocular, multilocular, papillomatous, and dermoid.

Pathology. — UNILOCULAR CYSTS develop from the hilum of the ovary, or they may in the beginning be ordinary multilocular cysts in which one cyst has developed so much more rapidly than the others that the main volume of the tumor is made up of one cyst. They are usually thin-walled and may attain a large size. The fluid in them is usually very thin and very light in color. The cyst wall is made up of connective tissue and usually lined by a single layer of columnar epithelium. In the larger tumors the epithelium becomes very much thinned out or disappears.

MULTILOCULAR OVARIAN CYSTS OR ADENO-CYSTOMATA of the ovaries are glandular growths that develop from the cortex. As a rule they have a dense fibrous capsule which is of a glistening whitish color. When the capsule is thin it is sometimes bluish in color. The surface is usually lobulated. This lobulation is due to the fact that the tumor is made up of a number of individual cysts. They may attain an enormous size. The fluid contained in the cyst is identical with mucus but varies greatly in consistence and color. It may be thick and gelatinous or sufficiently thin to flow very freely. It varies in color from a nearly clear fluid to almost black. The variations in color a due to the mixture of the contents of the cyst with blo from hemorrhages into the cyst. Many variations bo in color and consistence may be found in the differe

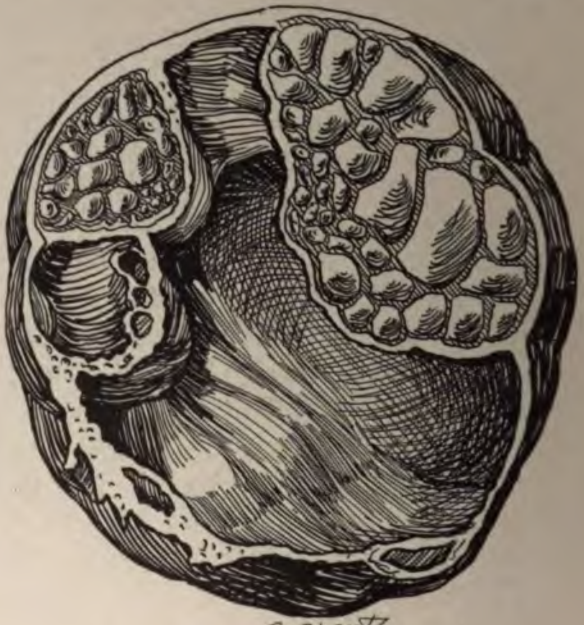

FIG. 121. — MULTILOCULAR OVARIAN CYST.

cysts of the same tumor. Multilocular cysts are usual unilateral.

On microscopical examination the cyst wall is found be made up mainly of connective tissue. In exception instances a Graafian follicle may be found. There a present in the cyst wall many gland spaces lined by single layer of columnar epithelium (Fig. 122). The growt of the tumor is due to the proliferation of the glands an the filling up of the spaces by the secretion from thei lining epithelium. As the cysts increase in size and pre sure becomes greater the epithelium becomes flattened. Later it may entirely disappear.

PAPILLOMATOUS TUMORS are multilocular, but in many of them one cyst develops so much more than the others that they are apparently unilocular. They are characterized by the development of wart-like growths which project into the cavity of the cysts. In outer appearance many of these tumors resemble very closely the ordinary multilocular cysts. It frequently happens, however, that the wall of one cyst ruptures. The papillomata continue to grow through the rupture and on the outer surface of the cyst wall. The appearance then is of a solid or semi-solid growth covered with warts.

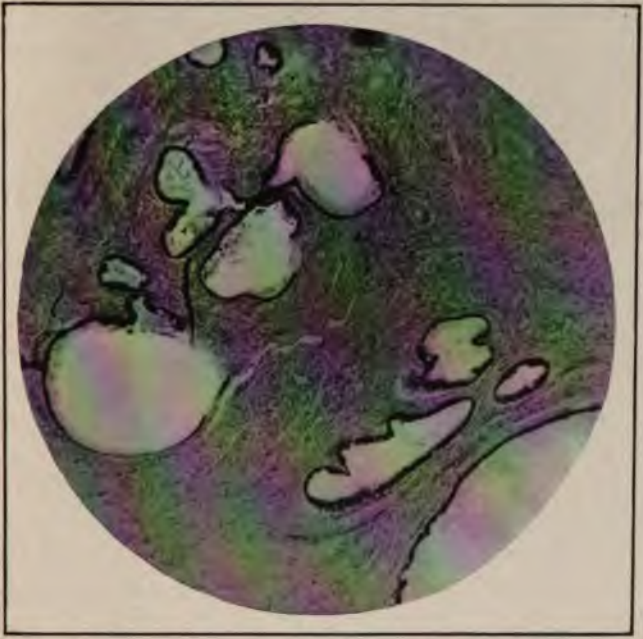

FIG. 122. — WALL OF MULTILOCULAR OVARIAN CYST. (Photomicrograph.) Several gland spaces surrounded by dense connective tissue are shown.

The papillomata have a tendency to become fixed to and proliferate on any surface with which they come in contact. It is not unusual to see them growing on the uterus, all over the pelvic peritoneum, or scattered through the abdominal cavity. They may recur in the scar of the abdominal wound after operations for their removal. These tumors are classified as benign growths, but on account of the tendency of the papillomata to develop on any tissues with which they come in contact they are to be dreaded almost as much as a truly malignant tumor.

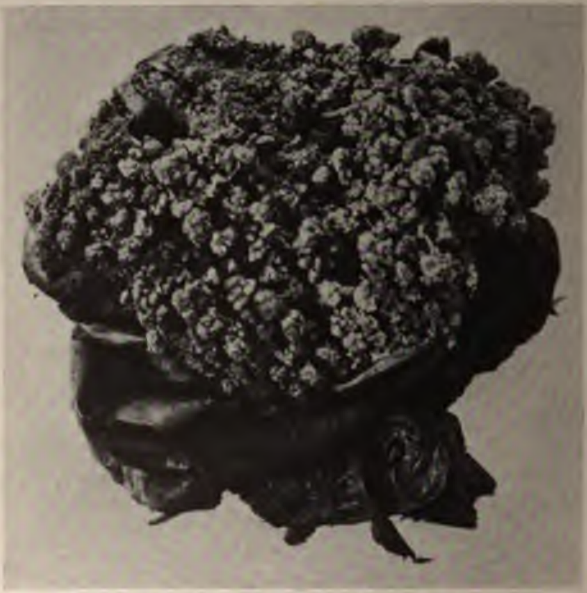

FIG. 123. — PAPILLOMATOUS OVARIAN CYST.

Papillomatous cysts are usually bilateral. These tumors as a rule do not grow nearly so large as the adeno-cystomata. Many of them have their origin near the hilum of the ovary and grow downward into the broad ligament. The fluid in the cyst is usually very thin and of a light color. The cyst wall is made up of connective tissue which is well supplied with blood-vessels. The papillary growths consist of a connective tissue stem supplied by blood-vessels and covered on the outer side with columnar epithelium (Fig. 124).

A DERMOID CYST, as the name suggests, is one in which epidermal growths are found. These include skin, sebaceous glands, hair, teeth, bones, and sometimes nails. Very rarely partially developed mammary and thyroid glands are present. The skin found in these growths varies in thickness. It is sometimes pigmented and has a stratified squamous epithelium. The amount of hair present is extremely variable. There may be very little, or it may be present in large quantities and very long. The color of the hair in

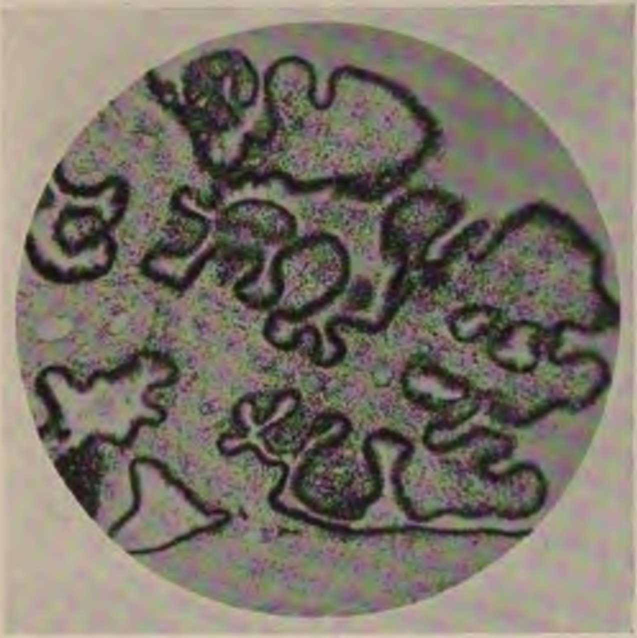

FIG. 124. — WALL OF PAPILLOMATOUS OVARIAN CYST. (Photomicrograph.) A segment of the cyst wall from which grows a single connective tissue stem with numerous branches covered with epithelium is shown.

Pedicle. — The pedicle of an ovarian tumor consists of the Fallopian tube and an elongated portion of the broad ligament. In simple cases it is drawn out into a relatively narrow body. In some instances the tumor grows down between the layers of the broad ligament. In these cases there is no pedicle proper. Usually, however, the outer portion of the broad ligament which carries the ovarian artery near its upper border can be isolated so the artery can be clamped.

Rate of Growth. — The rate of growth of all ovarian cystomata is extremely variable. The adeno-cystomata grow more rapidly than the other forms, but there is no regularity in the rate of their development. Some grow so rapidly that in a few weeks the whole abdomen is filled. Others may be present for long periods before attaining sufficient size to inconvenience the patient. Papillomata grow more slowly and do not attain the size of the adenocystomata. Once started, however, there is little tendency for them to stop in the course of their development. Dermoids frequently remain latent for long periods and then in a comparatively short time develop into tumors of considerable size.

Symptoms. — As a rule, the first symptom that is noted by the patient who has an ovarian tumor is an enlargement in the abdomen. There may be more or less abdominal discomfort of an indefinite nature. Vesical tenesmus from pressure is sometimes noted. Menstruation may not be affected at all. In some cases it is increased in quantity. Occasionally there is a dysmenorrhea. The most important secondary result of the increase in size of an abdominal growth is the interference with digestion. This is probably a purely mechanical result of the pressure of the tumor upon the stomach and intestines. The multilocular ovarian cyst produces a definite toxemia which results in malnuabdominal wall has a tendency to flatten them. Consequently they are less prominent than the multilocular cysts. When the tumor does not entirely fill the abdominal cavity that part of the abdominal wall lying directly over the tumor moves little or none with inspiration and expiration, while the upper abdominal wall rises and falls regularly with the breathing.

By *palpation* the outlines of the tumor can usually be made out, although when a thin-walled unilocular cyst or a very large multilocular cyst is present, the outlines of the tumor may be very indistinct. Fluctuation can usually be recognized. It is very much more pronounced in unilocular than in multilocular cysts.

On *percussion* the area of dullness extends from the pubes to near the upper border of the tumor and laterally from the median line to near the lateral borders of the tumor. The flanks and epigastric region are tympanitic. The location of the areas of dullness and tympany are not materially modified by change in the position of the patient.

On *vaginal examination* a normal-sized uterus can be found in the pelvis. If the tumor is one that is readily movable, by pushing it up with the hand over the abdomen and at the same time drawing down the uterus with a tenaculum, the pedicle may be felt either through the rectal or the vaginal wall.

Differential Diagnosis. — Other conditions that produce enlargement of the abdomen and which must be differentiated from ovarian tumors are pregnancy; large uterine fibroids; ascites; fat abdominal wall; distended intestines; tuberculous peritonitis with encysted fluid; distended bladder; and occasionally renal, hepatic, and splenic cysts.

PREGNANCY. — In pregnancy there is a history of cessation of the menses. The breasts are enlarged and tender. There is an increased pigmentation around the nipples;

mal-sized uterus to be felt below the tumor as there when the enlargement is an ovarian cyst. There is ually more disturbance of menstruation with fibroids than th ovarian tumors. Fibroids develop more slowly than arian tumors.

Ascites. — In ascites the abdomen is flat and the flanks ulge (Fig. 127). No definite tumor mass can be felt by alpation. Fluctuation can usually be made out. On perussion the most dependent parts are dull and the most levated portions in the abdominal wall are tympanitic. This is just the reverse of the areas of dullness and tympany when an ovarian tumor is present. By changing the position of the patient the relative areas of dullness and tympany change. The area of dullness on the dependent side increases, while on the elevated side the percussion note becomes tympanitic.

In exceptional cases, when there is a very great accumulation of ascitic fluid, the abdominal wall is pushed so far forward that the mesentery prevents the intestines from coming in contact with it. The whole abdomen is then dull on percussion. Some of these cases are difficult to differentiate from very large ovarian tumors that have developed rapidly.

Fat Abdominal Wall. — This condition can usually be recognized by noting the deposits of fat in other portions of the body. By grasping a fold of the abdominal wall between the two hands the thickness of it can be readily determined.

Distended Intestines. — When the abdominal enlargement is due to the distention of the intestines the tympanitic area extends over the whole abdominal wall. The absence of a tumor can be recognized by pressing with the hand firmly downward in the median line of the abdomen until the vertebral column is felt. In exceptional cases it may be necessary to examine these patients under an anesthetic.

Tuberculous Peritonitis. — Occasionally as a result of tuberculous peritonitis, closed-off cavities within which fluid accumulates are formed. These may distend the abdomen and very closely resemble in outline an ovarian tumor. The formation of these cysts is always preceded by an active tuberculous peritonitis, of which a history can usually be obtained. They are also usually associated with other definite indications of tuberculous peritonitis. They are fixed in their position. Usually they do not give the history of a tumor that has developed upward into the abdomen from the pelvis.

Distended Bladder. — A distended bladder forms an ovoid cystic tumor in the median line of the abdomen which may extend as high as the umbilicus. Over-distention of the bladder is usually due either to a retroverted pregnant uterus or to an adherent pelvic ovarian tumor. Exceptionally it may become over-distended from atony. When the bladder is over-distended there is usually a constant dribbling of urine which leads the patient to think that the bladder is empty. In attempting to relieve an over-distended bladder a male soft-rubber catheter should be used. It must be inserted far enough to reach beyond the point of obstruction. The evacuation of the bladder clears up the diagnosis.

Complications. — The most frequent complications of ovarian tumors are twisted pedicle, adhesions, infections, ruptures, and malignancy.

Twisted Pedicle. — When the pedicle of an ovarian tumor becomes twisted the circulation is interfered with and occasionally the blood supply is entirely cut off. When the blood supply is interfered with only to a limited extent the tumor becomes congested, dark in color, and as a rule hemorrhages take place into it. If the blood supply is entirely cut off, gangrene results. When a pedicle becomes twisted the patient complains of a sharp pain coming on suddenly. The abdomen enlarges rapidly and becomes tender. The severity of these symptoms varies with the extent to which the circulation in the pedicle is interfered with. When the patient is known to have had an ovarian tumor the twisting of the pedicle can usually be recognized by the sudden onset of pain, tenderness, and distention.

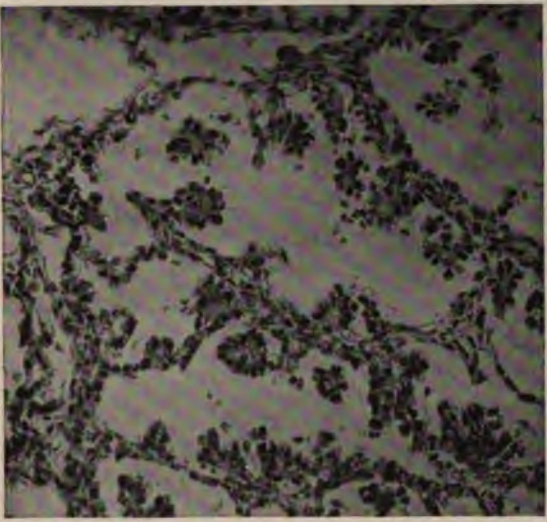

FIG. 128. — CARCINOMA OF THE OVARY DEVELOPING FROM PAPILLOMATOUS CYST. (Photomicrograph.)

ADHESIONS. — Adhesions between ovarian tumors and other pelvic and abdominal viscera may be due to infection communicated from the Fallopian tubes or from the intestinal canal. They are sometimes due to the irritation produced by the tumor itself exclusive of any definite infection. Adherent ovarian tumors can only be recognized before operation when the tumors are of such size that they would under ordinary circumstances be easily movable.

Infections. — Ovarian tumors may become infected from the Fallopian tubes, by continuity through the intestinal wall, or by an infection carried by the blood stream. Dermoid cysts are more frequently infected than any other kind.

Ruptures. — Ruptures of ovarian cysts are usually due to blows or falls. A rupture can usually be recognized by the loss of the tumor outline and evidence of free fluid in the peritoneal cavity. The fluid from multilocular cysts is non-irritating to the peritoneum and its presence gives rise to no symptoms, but it is not absorbed. If the rupture takes place at a position in the cyst wall where there are no blood-vessels of importance, the patient may have only slight discomfort at the time. The cyst continues to secrete and the abdomen gradually fills up. If the rupture should

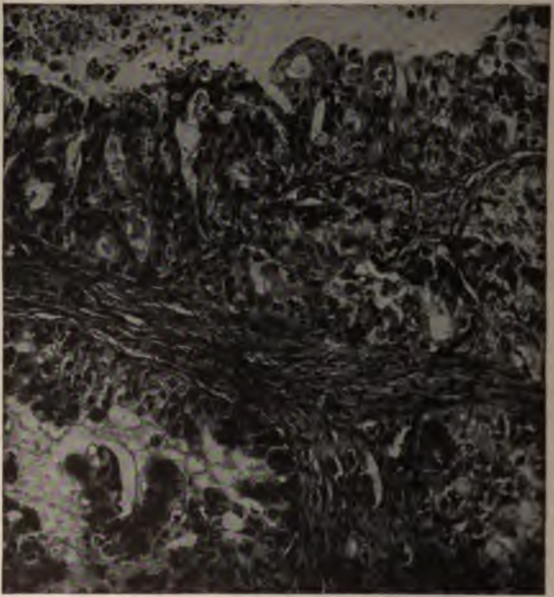

Fig. 129. — Carcinoma of the Ovary Developing from an Adeno-cystoma. (Photomicrograph.)

take place at a position in the cyst wall where there are large vessels, there may be such a profuse hemorrhage into the abdominal cavity as to cause death.

MALIGNANCY. — About twenty-five per cent of all ovarian cystomata are malignant. Carcinomata and sarcomata are the forms most frequently found, but some of the rarer malignant growths are also met with. Carcinomata develop from the abundant epithelium present both in the adeno-cystomata (Fig. 129) and the papillomata (Fig. 128). The sarcomata (Fig. 130) have their origin in the cyst walls. As a rule there is nothing to distinguish the malignant from the non-malignant tumors before the abdomen is opened. When a solid mass is found in one part of an ovarian cyst malignancy should be suspected. The diagnosis of malignancy is frequently not made until after the tumor has been removed.

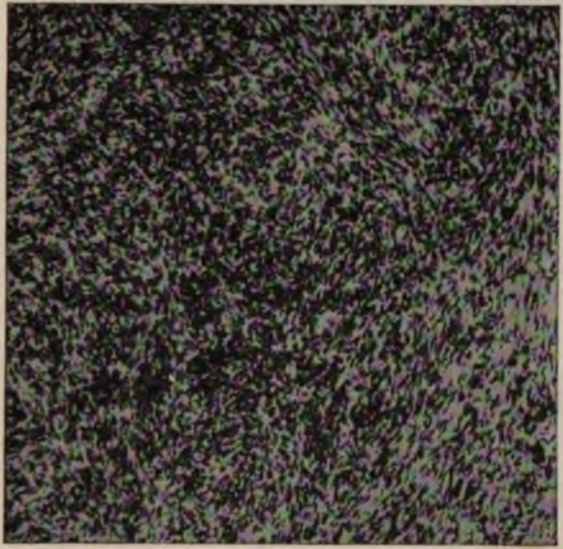

FIG. 130. — SARCOMA OF THE OVARY. The section is from a cyst wall.

Prognosis. — There is only one definite statement can be made as to what will result from an ovarian cys which is not removed, and that is, that it will surely c the death of the patient. If she escape the dange infection, twisted pedicle, rupture, and malignancy t is no escape from the toxemia and profound digestive turbances. These latter may be the direct cause of d or they may so weaken the sufferer that some trifling i current malady may cause a fatal termination.

Treatment. — All ovarian tumors should be rem through an abdominal incision. This incision is mad the median line between the umbilicus and the symph The first incision should be large enough to allow the in duction of the hand into the abdominal cavity. The l should be introduced and passed over the surface of tumor to locate any adhesions, to determine the chara of the pedicle, and to seek for any indication of malign or infection. If the tumor is made up of a single t walled cyst the intestines are packed off and the punctured with a knife. By making pressure on the s of the tumor through the abdominal wall the fluid cont can be forced out through the small opening in the wall and caught in a basin. As the tumor collapses cyst wall can be drawn out through the abdom incision. The pedicle is then clamped and the excised. The pedicle should be tied off in secti taking care not to include too large a portion in any ligature.

Unfortunately this extremely simple operation is applicable to a very large proportion of ovarian cystom It should not be attempted in dermoids, in papillomata, in adeno-cystomata which have a solid growth in one of them. It is also not applicable to infected ovarian tun or to those which are clearly malignant. All of these tun should be removed through an abdominal incision long enough to allow the delivery of the entire tumor without breaking the cyst wall. In all cases where there is any doubt as to the character of the contents of the tumor, it should be removed through the long incision.

Adhesions between the sac and the parietes or between the sac and the contents of the abdominal cavity are the most common obstacles in the delivery of ovarian cysts. When the adhesions are over the front of the tumor it makes it very difficult to determine when the incision is through the peritoneum. The stripping of the peritoneum from the abdominal wall in attempts to separate the adhesions has been done many times. Intestinal adhesions can usually be separated from the sac wall with a piece of gauze over the finger. When the adhesions are very firm it may be necessary to separate the adhesions with a knife. When this is done, care should always be taken to make the dissection at the expense of the cyst wall. All bleeding points that are caused by the separation of adhesions should be secured immediately. If the vessels are of considerable size they should be tied with fine catgut. Oozing from very small vessels can usually be checked by pressure with gauze. Omental adhesions are best separated by rubbing them off with a piece of dry gauze. When the separated omental surface has a tendency to ooze freely it should be firmly ligated.

In those cases in which the tumor has grown down between the layers of the broad ligament, it is usually possible to isolate and secure the ovarian artery near the pelvic wall. When this is done, an incision can be made between the ligature and the tumor. The tumor is then dissected upwards, and the vessels entering it near the uterus can be secured. In exceptional cases the growth penetrates so near the large blood-vessels that it is safer to excise the

CHAPTER XIX

SOLID OVARIAN TUMORS, PAROVARIAN CYSTS, AND TUMORS OF THE BROAD LIGAMENTS

SOLID TUMORS OF THE OVARY

About five per cent of all ovarian tumors are solid. They include fibromata, papillomata, carcinomata, and sarcomata.

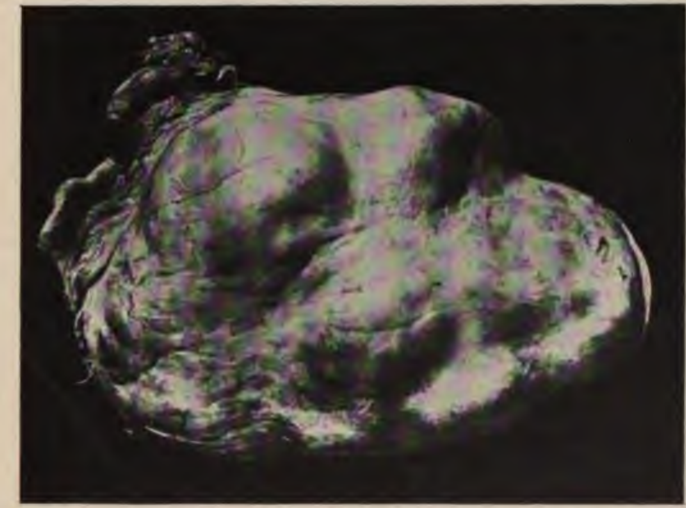

FIG. 131. — OVARIAN FIBROID.

Fibromata. — Ovarian fibroids are histologically identical with uterine fibroids. They may involve only a portion of the ovary or the whole of it. They sometimes attain a very considerable size. When they are small and involve carcinoma from which the ovaries become infected is usually seated in the stomach, gall bladder, or other structures in the upper abdomen. Metastasis from the upper abdomen to the ovaries apparently takes place much more frequently before than after the menopause.

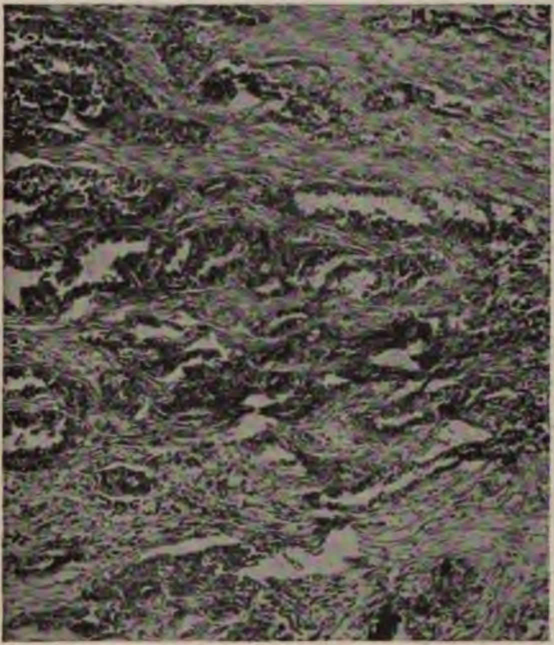

FIG. 133. — SOLID OVARIAN CARCIMONA. (Photomicrograph.) The slide was made from the tumor shown in Fig. 132.

Sarcomata. — Solid sarcomata of the ovaries are very rare. They may occur at any age. They are usually of the spindle-cell variety. They grow very rapidly.

Treatment. — All solid ovarian tumors should be removed by abdominal section. In cases of bilateral solid carcinomata very little is to be expected from their removal unless the primary carcinoma is also removed. When these carcinomata are discovered at operation the upper abdomen should always be carefully explored.

PAROVARIAN CYSTS

The parovarium lies in the broad ligament just betwe the ovary and the Fallopian tube. It consists of the remai of Gartner's duct which, in that part of its course, ru parallel with the Fallopian tube, and a series of sho tubules which join it at right angles and are known Pflüger's tubules.

The cysts of the parovarium develop from either Ga ner's duct or one of the tubules of Pflüger. They a usually not pedunculated, and are spread out between t layers of the broad ligament. They are very thin-wall and over them they have a non-adherent layer of pe toneum which is a portion of the distended broad ligame The fluid in them is thin and clear. The Fallopian tube stretched out over the tumor and the ovary is not affect They grow very slowly. They are sometimes associat with cysts in the anterior vaginal wall which are dilatatio of the lower portion of Gartner's duct.

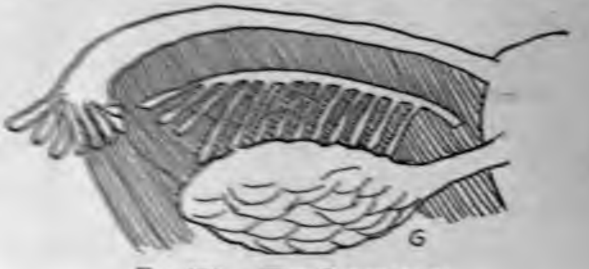

FIG. 134. — THE PAROVARIUM.

Symptoms. — The symptoms produced by parovari cysts are due to the pressure they exert on other pelv organs. As they become larger they extend up into t abdomen. They may cause constipation by direct pressu upon the rectum. They often cause frequent urination pressing the bladder against the pubes.

Diagnosis. — It is not always possible to distinguish parovarian cysts from ovarian tumors, but their fixed position, thin walls, fluctuating contents, and slow growth help to identify them.

Treatment. — After the abdomen is opened it is usually possible to split that part of the broad ligament which is stretched over the most prominent portion of the tumor and enucleate the tumor. The opening in the broad ligament is then closed with fine catgut.

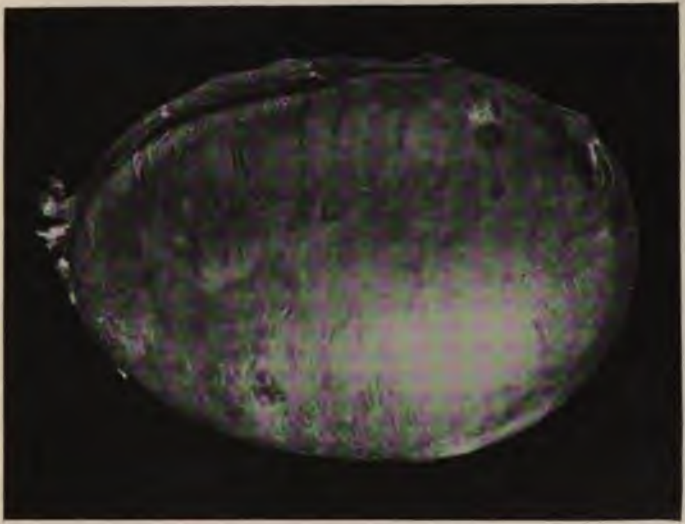

Fig. 135. — Parovarian Cyst.

SOLID TUMORS OF THE BROAD LIGAMENT

Fibroids, sarcomata, carcinomata, and hypernephromata all are found occasionally in the broad ligaments. A diagnosis is rarely made of any of them until after removal. Most of them require a microscopical examination of the tumor to determine their character. The only method of treatment is to remove the tumor by abdominal section.

VARICOCELE OF THE BROAD LIGAMENT

Varicocele of the broad ligament occurs with relative frequency. The veins most frequently dilated are those in the upper part of the broad ligament, although all the veins in both broad ligaments may be involved.

Etiology.—Varicose veins of the broad ligaments occur most frequently in women who have borne children. Uterine displacements favor their development. Large fibroids of the uterus nearly always have associated with them varicose veins of the broad ligaments. In a considerable proportion of cases no definite cause can be assigned for their presence.

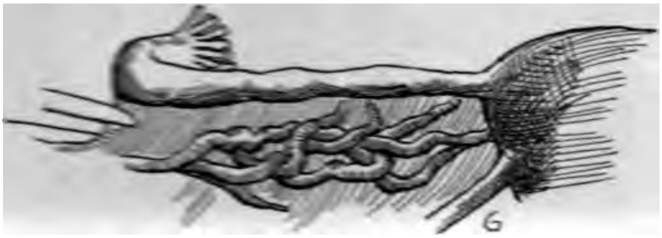

Fig. [illegible]. — Varicocele of the Broad Ligament.

Symptoms. — There is usually a dull pelvic pain which is exaggerated by standing or walking. The menstrual flow is increased. There is a tendency to post-partum hemorrhage.

Diagnosis. — The diagnosis can sometimes be made if in connection with the already mentioned symptoms a somewhat boggy mass can be felt on one or both sides of the uterus. Usually, however, the diagnosis is made by inspection after the abdomen has been opened.

Treatment. — When there are no indications for the retached to cover the mouth and nose is worn. The gloves may be sterilized by boiling, and the cap and gown may be sterilized by steam along with the sponges.

Anesthesia. — Under special conditions it may be satisfactory to operate under a local anesthetic, but ordinarily a general anesthetic is more satisfactory, and for this purpose ether administered by the drop method can be used in a greater proportion of cases than any other anesthetic. Chloroform is preferred by some operators, but ether is undoubtedly safer.

Position of Patient. — The Trendelenburg position is the one ordinarily employed for all pelvic operations that are done through the abdomen. The chief advantages of it are that it carries the intestines upward out of the pelvis and allows a very much freer view of the pelvic structures than can be had in any other position.

Operations for extrauterine pregnancy, large ovarian cysts, and a few other conditions are done by preference with the patient in the dorsal position with the legs extended.

Incision. — The incision is made in the abdominal wall between the umbilicus and the symphysis, and a little to one side or the other of the median line. The placing of the incision to one side of the median line is done in order to go through the rectus muscle. Tension upon the rectus muscle when the wound is in this position has a tendency to close and not to cause a gaping of the wound, and in this way helps to prevent the formation of a post-operative hernia. The length of the incision depends upon the thickness of the abdominal wall, the size of the growth to be removed, or the character of the work to be done in the pelvis.

The first incision is carried through the skin and fat down to the fascia of the rectus muscle. When the bleeding points have been controlled the fascia is opened and the fibers of the rectus muscle separated by blunt dissection. The posterior sheath of the rectus is opened. The peritoneum is then picked up at the upper end of the wound (to avoid the bladder) by two dissecting forceps and a small cut made into it. If the patient is in the Trendelenburg position, air will rush in through the small opening in the peritoneal cavity and allow the peritoneum to be lifted sufficiently away from the intestines so that it can be incised as far as wished without danger of injuring the intestines.

Drainage. — It is not possible to give hard-and-fast rules for the employment of drainage. It should be employed in all cases where there has been free pus in the pelvis of staphylococcus or streptococcus origin. These will ordinarily include all cases of pelvic infection following miscarriages or labor. Where there has been an injury to a ureter, the bladder, or the intestine, drainage should be used. Many gonococcus infections, other conditions in which there are only adhesions, extrauterine pregnancies, and non-infected cases should not be drained.

The most satisfactory route for drainage is through Douglas' cul-de-sac into the vagina. This drain should be inserted from above downwards and can be introduced by two methods. By splitting the posterior vaginal wall just below the cervix from the abdominal side, the end of the drain can be pushed out into the vaginal canal. Another method is to have an assistant introduce a pair of long, heavy, slightly curved forceps into the vagina and push them up into the posterior fornix where they can be seen pouching into the pelvis beyond the cervix. This is cut down upon and the forceps allowed to penetrate into the pelvic cavity. The forceps are then opened to stretch the opening in the vaginal wall and a large gauze drain is then introduced into the bite of the forceps from the pelvic side and the forceps are withdrawn carrying the gauze. The end of the gauze is left projecting into the vagina and the upper portion of it is applied to the parts of the pelvis that need to be drained. The abdominal wall is closed over it tightly.

When it is not practical to drain through the cul-de-sac the drain should be brought out through the lower angle of the incision. In this position several gauze drains covered with rubber protectors are very satisfactory.

The drains into the vagina should be drawn down a couple of inches at the end of forty-eight hours, and after that drawn down and cut off a little every second or third day until the drain is completely removed at the end of about one week. The drain through the abdominal wall should be loosened up in two or three days. As there are usually several drains put in, they should be removed one at a time.

Closure of the Abdominal Wound. — A stitch of number two chromosized catgut is inserted through the fascia of the rectus muscle and through the muscla and the peritoneum. The end of the suture is secured by forceps. This suture is then carried by a cobbler's stitch back and forth through the edges of the peritoneum only, until it is entirely brought together. When the peritoneum is brought together in this way the cut edges of it are turned up into the wound and a smooth surface is obtained on the under side of the abdominal wound. When the last stitch is put in the peritoneum the end of the suture which is still free is caught with forceps. The suture is tied and the short end is then cut away, leaving a double thread, which is carried up through the muscle and through the fascia. It is then carried back along the line of fascia by a continuous stitch in such a manner as to cause the edges of the fascia to overlap. This brings the suture back to the point of original insertion, where it is tied to the free end which is held by the first pair of forceps. Ordinarily it is not necessary to put any stitches in the fat and superficial fascia, but where the abdominal wall is exceptionally thick, a few interrupted, loosely tied catgut sutures are an advantage. The skin is closed by a horse hair put in with a buttonhole stitch. Where very much tension on the wound is feared the catgut stitches can be reinforced by a few figure-of-eight silkworm-gut stitches that bring together all of the structures except the peritoneum. These figure-of-eight stitches must be tied very loosely.

Dressing of Wound. — The wound is dressed by putting a strip of gauze about one inch wide and about ten layers thick over it. A short strip of adhesive plaster is put over the lower end of the dressing, and strips of adhesive plaster two inches wide, and long enough to extend two-thirds of the circumference of the body, are put on overlapping each other slightly until the entire length of the wound is covered. No other dressing or bandage is used. A narrow dressing allows the adhesive plaster to become attached to the skin very close to the edges of the wound, so that all strains from coughing or other movements of the patient are thrown upon the adhesive plaster and not upon the edges of the wound and the stitches holding it together. The patient can move about in bed without displacing the dressings. Where an abdominal drain has been put in, the portion of the wound above the drain is closed

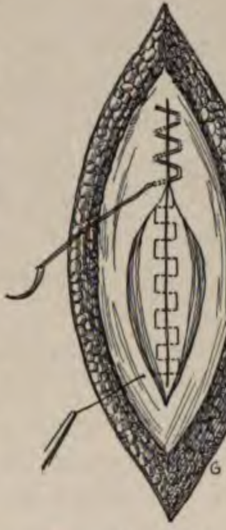

FIG. 137. — CLOSURE OF ABDOMINAL WOUND.

and dressed in the same manner as if there had been no drain put in. Over the drain a large loose gauze dressing is placed, which is held loosely in its position by adhesive plasters. This dressing can be changed at any time or the drains removed without disturbing the dressing on the wound above the point of drainage.

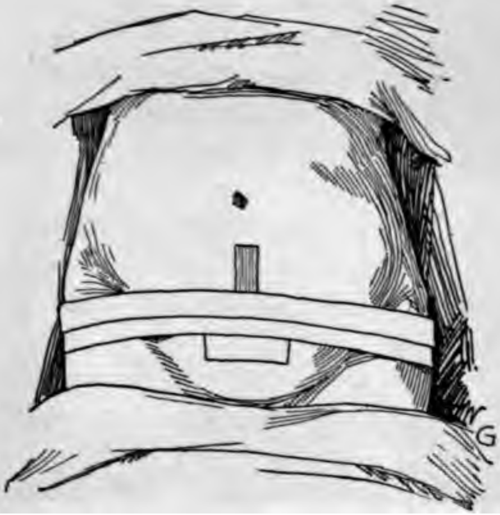

FIG. 138. — DRESSING OF ABDOMINAL WOUND.

VAGINAL OPERATIONS

Preparation. — The preparations for vaginal operations are the same as those already described for abdominal operations in regard to the place and time of operation, the instruments, and the operator and assistants. The preparation of the patient involves the same principles as the preparation for an abdominal operation. The bladder and bowels should be emptied. The pudendum should be shaved. The vulva and vagina should be thoroughly washed with soap and water and then with one to two thousand bichloride of mercury solution.

Posterior Vaginal Section. — Posterior vaginal section is done most frequently to relieve large collections of pus in the pelvis, more particularly the pelvic abscesses that follow miscarriages and labor. These are usually either streptococcus or staphylococcus infections, and an abdominal operation for an active infection with either of these micro-organisms present is very likely to be disastrous. Large hematomæ, especially if they are infected, and some few other conditions are operated upon through the posterior vaginal wall.

METHOD OF OPERATION. — The perineum is retracted by an ordinary Simon or Jackson retractor and the cervix is grasped by a bullet forceps and drawn upward and forward. A long incision beginning immediately behind the cervix is carried downward and forward in the median line of the posterior vaginal wall. When operating for pus in the cellular tissue of the pèlvis after the vaginal wall is incised, the remainder of the opening is made by blunt dissection.

Anterior Vaginal Section. — The peritoneal cavity is opened through the anterior vaginal wall for the removal of small tumors of the ovary, of the tube, or of the body of the uterus.

METHOD OF OPERATION. — The perineum is retracted, the cervix is drawn downward, and a transverse incision is made through the mucous membrane of the vagina just above the point where it joins the cervix. Another incision is carried from the middle of this line upward through the anterior vaginal wall toward the meatus in order to get all the room necessary. The bladder is separated from the uterus; the peritoneal cavity is opened, and the fundus of the uterus is drawn downward and forward through this [illegible] the whole of the body of the uterus and [illegible] cavities easily accessible.

[illegible] the Cervix.—The most efficacious method [illegible] tion of the cervix is with some form of [illegible] dilators. The degree of dilatation required varies with the necessities of the subsequent operation. When an attempt is made to remove a growth from the interior of the uterus, or when the dilatation is done to overcome a congenital narrowing of the cervical canal, a very wide dilatation is [illegible], while in cases in which a curettage for diagnosis is to be done, it is only necessary to dilate the cervix sufficiently wide to introduce a proper curette. There are great differences in the friability of the cervix, and care should be taken not to lacerate it by making too much tension upon a diseased cervix, or by allowing the dilator to slip down so that the tension will come on the external os.

Curettage.—The edge of the curette should be sharp, and it should be so made that this edge will strike the endometrium at right angles, so that the effect is never to cut into the uterus but to scrape over its surface. The end of the curette should be slightly flattened so that a surface and not a single line will be scraped at each stroke of the curette. For incomplete miscarriages a square-ended curette about half an inch wide is used. In attempting to remove the remains after a partial miscarriage, it is of especial importance to go over carefully the entire anterior wall of the uterus. In curetting for carcinoma of the cervix the curette should be carried at each stroke as nearly down to healthy tissue as possible. This lessens very materially the hemorrhage. A sharp curette should be used and one that is large enough, so that the whole field may be gone over quickly.

Before curetting, a gauze sponge is placed in the vagina just under the cervix, and all material scraped out of the uterus is caught on this sponge and afterwards prepared and examined microscopically. After the whole endometrium has been thoroughly gone over with the curette, the cavity of the uterus is wiped out with two strips of gauze saturated with a weak solution of bichloride. It is then wiped out with a piece of dry gauze. No packing is left in the uterus except to control excessive bleeding and in cases of stenosis of the cervix.

LOCAL TREATMENT

Douches. — Vaginal douches are given for their cleansing effect and for definite therapeutic purposes. For ordinary cleansing the most satisfactory douche is normal salt solution. The temperature of it should be about one hundred degrees F., and about two quarts is the quantity ordinarily used. To exercise a definite therapeutic action douches of a temperature of one hundred and ten to one hundred and fifteen degrees are used in inflammatory conditions in the pelvis. Either plain water or normal salt solution can be used. The patient should be upon her back with the hips slightly elevated. The fountain syringe used should have a free flow, so that a large volume of water can be used under low pressure. The quantity of water used should be from one to two gallons. Douches of one to four thousand bichloride of mercury or other antiseptic solutions of similar strength are used in infections of the vagina. All antiseptic douches should be followed by a douche of plain water to remove any excess of the antiseptic.

In the late stages of carcinoma of the cervix, or other conditions producing offensive odors, weak solutions of permanganate of potash or saturated solutions of boracic acid may be used as deodorants.

nitrate of silver, and carbolic acid in the treatment of diseases of the vulva, vagina, and cervix has been mentioned in connection with the special diseases. Local applications to the uterine canal above the internal os are not recommended for any condition. The benefit to be derived from them is always doubtful and the danger of carrying infection to the tubes in attempts to use them is great.

[illegible] — [illegible] of shock [illegible]

[illegible] of shock [illegible]

[illegible] The symptoms [illegible] after the [illegible]

[illegible]

[illegible] — Post-operative hemorrh

[illegible]

cut too close to the knot. The signs of hemorrhage can usually be distinguished from those of shock. The symptoms appear a few hours after the conclusion of the operation instead of immediately as they do in shock. The pulse is weak and usually rapid, but it may be slow. The patient becomes very pale and there is gasping respiration indicating air hunger. There is a fall in the body temperature. These symptoms, except in cases of sudden and severe hemorrhages, are not marked in the beginning but gradually increase in intensity. It is very important that postoperative hemorrhages should be recognized promptly, because the only treatment is to reopen the abdomen and secure the bleeding vessels.

Vomiting. — For repeated vomiting the most satisfactory treatment is stomach lavage. Some patients without having marked vomiting have nausea with a great deal of pain and distention of the stomach. This is very frequently due to the presence of an excessive quantity of mucus or bile in the stomach. The relief obtained by washing out the stomach is immediate.

Distended Intestines. — The distention of the intestines by gas after operation is a source of much discomfort to the patient. If the intestines are not allowed to be exposed to the air during the operation, they are very much less likely to become distended with gas afterwards. As a prophylactic during all pelvic operations, as soon as the abdomen is opened the intestines and omentum should be pushed well above the line of incision and kept there by abdominal packs. The upright position after operation also diminishes the number of cases where distention of the intestine gives trouble. When distention of the intestines does occur, much relief can be obtained by an ordinary soap and water enema, or an enema containing half an ounce of turpentine.

Infection of the Abdominal Wound. — The abdominal

CHAPTER XXII

POST-OPERATIVE TREATMENT

ABDOMINAL OPERATIONS

Position of Patient. — After all abdominal operations, as soon as there is partial recovery from the anesthetic the patient should be placed in the upright position. When this is done the complete recovery from the anesthetic is prompt and the nausea and vomiting are decreased; the intestines resume promptly their proper relation to each other and there is much less tendency for the stomach and intestines to become distended with gas; all blood and exudate resulting from irritation of the peritoneum gravitates promptly to the pelvis, where it produces less disturbance than it does in the upper abdomen. The exceptions to this rule should be patients who have lost a large quantity of blood, or when from other causes the condition of the heart contraindicates the upright position. Under ordinary circumstances it is not necessary for the patient to maintain this upright position more than a few hours. After that she should assume the position which is most comfortable to her.

All drainage cases should be kept in the upright position for forty-eight hours. At the end of that time protective adhesions are formed shutting off the field of operation from the remainder of the abdomen so that the position of the patient becomes of less importance. So long as the drain is in position the patient should sit up for a part of each day.

Diet. — After the patient has recovered consciousness from the anesthetic she may be given a tablespoonful of hot water every two hours. If vomiting occurs the water should be suspended for from four to six hours, after which time it can be resumed. If the water is well borne it may be given in slightly increasing quantities. If there is severe pain during the first twenty-four hours after operation, morphia in small doses hypodermically should be given to relieve it. It is best to begin with a dose of one-eighth to one-sixth of a grain, which can be repeated if absolutely necessary. The object is to get along with the smallest possible quantity that will make the patient comfortable. No morphia should be given after the first twenty-four hours except under extraordinary indications. During the second twenty-four hours the amount of fluid can be increased, and if there is no disturbance of the stomach, small quantities of clear broth or small quantities of well-diluted albumen can be given. Milk is usually not well borne and should be avoided. The liquid foods can usually be increased in quantity during the third twenty-four hour period.

Beginning forty-eight hours after the operation the patient is given one-tenth grain of calomel every half hour until one grain is taken. Early the next morning two drams of sulphate of magnesia are given, and if the bowels do not move promptly a soap and water enema is given. After the bowels have moved, the patient is put on a semi-solid diet and then promptly on a regular diet.

Removal of Stitches. — On the eighth day the adhesive plasters are cut from below upward directly over the wound and turned back exposing the dressing. The dressing is removed and the stitches taken out. A narrow strip of dry gauze is then laid over the wound and the cut ends of the adhesive plasters are overlapped and secured with safety pins. The adhesive plasters will usually remain in position until time for the patient to get out of bed, and by that time they are usually loosened sufficiently to come off easily. When they have become loosened of their own accord they are entirely removed and a few long strips of fresh plaster are applied. These strips of plaster are allowed to remain on until they come off of their own accord. This is usually four or five weeks after the operation, and after that time no further support is needed.

Time in Bed.—The patient should be kept in bed from eight to fourteen days, the time depending on the character of the operation and the general condition of the patient.

VAGINAL OPERATIONS

Repair of the Vaginal Outlet.—One of the requisites of good results after operations on the vaginal outlet is to interfere as little as possible with the wound. A sterile pad is usually placed over the perineum, but it probably does as much harm as good. The perineum should be irrigated sufficiently often to keep it clean, but it should not be sponged or rubbed with a cloth. The patient should be given sufficient doses of magnesium sulphate to cause the bowels to move loosely every day. After operations for complete tears of the perineum it is of special importance to keep the bowel movements soft to prevent the stitches from being torn out by the expulsion of hard fecal masses. The patient should be allowed to void urine herself, because some normal urine flowing over the wound will do less harm than repeated catheterization. Vaginal douches should not be used until union has taken place. The patient should remain in bed about two weeks, but there is no occasion

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